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AVIATION

The Oldest American Aeronautical Magazine

SPECIAL FEATURES

THE *Distributor* ... WHO HE IS ... WHY HE IS
... AND WHAT HE DOES

THE *Continental* A-70

Fourth Annual ENGINEERING RESEARCH
CONFERENCE

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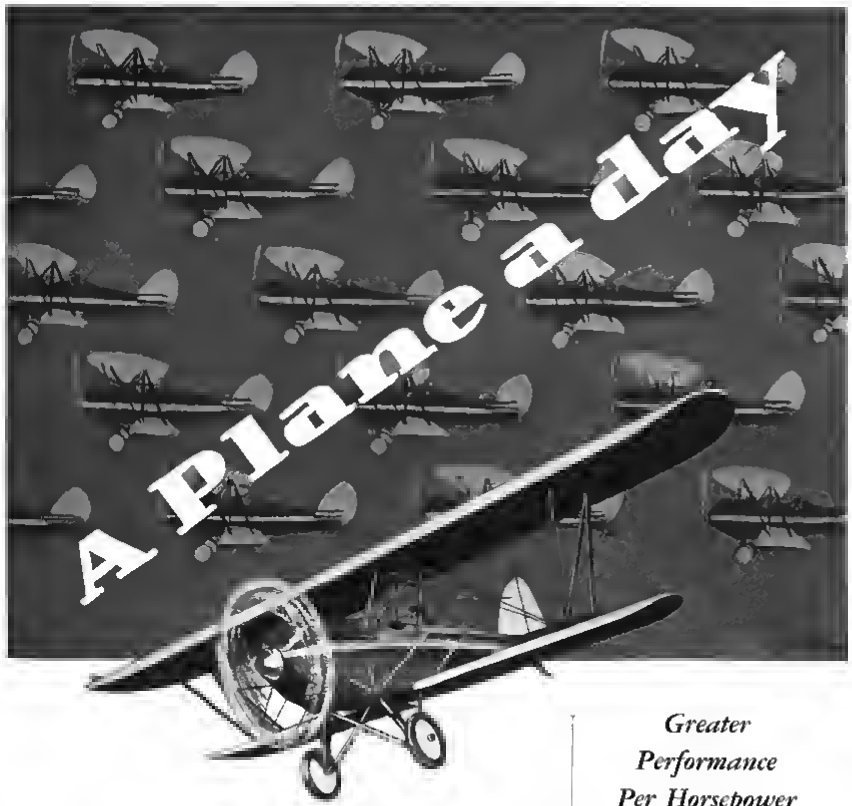

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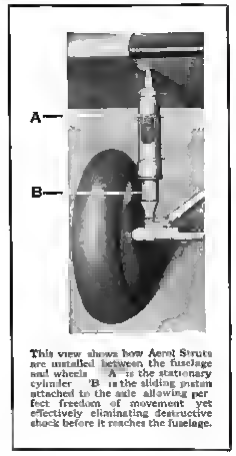
This confidence is reflected by 21 other manufacturers who have already standardized on this equipment, and by practically all other American manufacturers who are recommending Aerol Struts as optional equipment.

Aerol Struts are manufactured by The Cleveland Pneumatic Tool Company, Cleveland, Ohio.



This view shows how Aerol Struts are installed between the fuselage and wheels. 'A' is the stationary cylinder. 'B' is the sliding piston attached to the axle allowing perfect freedom of movement yet effectively eliminating destructive shock before it reaches the fuselage.

Ask the Pilots Who Land On Them

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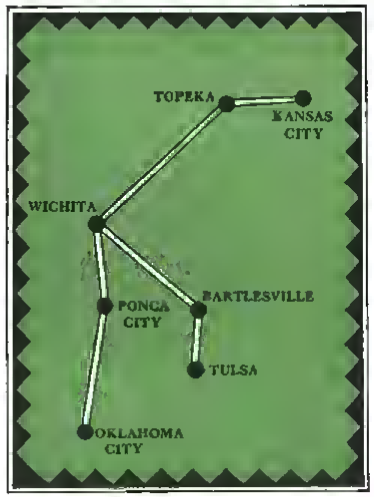

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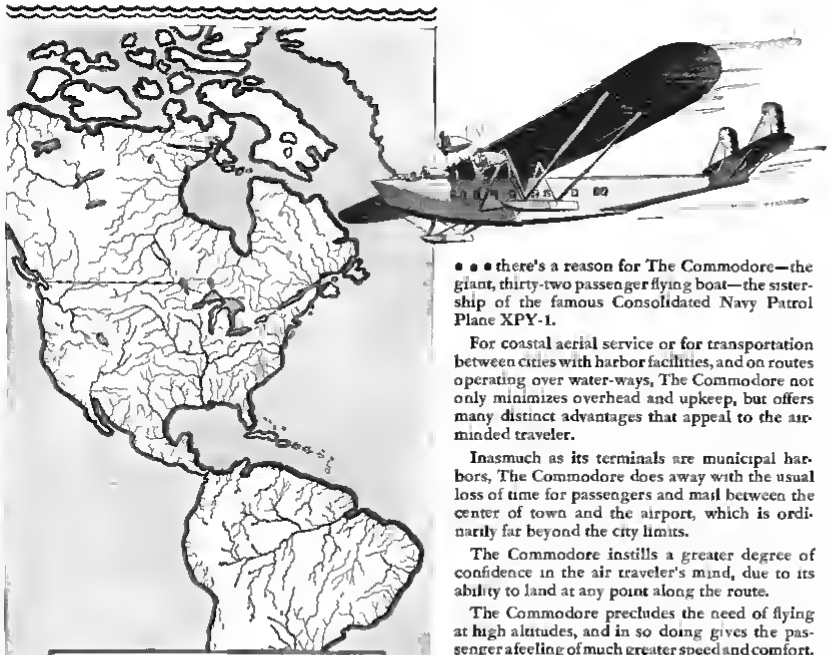

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Oil (10 gallons)	95 lbs.	Service ceiling	16,000 feet
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AVIATION

The Oldest American Aeronautical Magazine

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AVIATION

THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

May 25, 1929

Volume [illegible] Number [illegible]

The New Era

VISITORS at the NACA Conference at Langley Field were privileged to see the first public demonstration in the United States of two developments which are destined to have an immense importance on the future of aeronautics

The heavy fuel engine, both on account of its greater fuel economy and its lesser fire risk, has been the goal of much endeavor, but it was freely predicted that its practical use in aircraft was still many years away. The Packard Diesel engine which was shown and flown at Langley had successfully made the six hundred mile trip from Detroit, and although no details were given out as to its characteristics, it can not be denied that the long hoped for era of the heavy oil airplane engine is comparatively close at hand

Because the autogyro has been under development in Europe for many years it was perhaps difficult to appreciate the demonstration which Harold Pitcairn gave at Langley Field. Whether or not the autogyro is the plane of the future can perhaps be questioned but there is no doubt that it has certain performance characteristics for which we have all been hoping It will fly level at thirty miles per hour it will descend almost vertically and can stop with practically no run on the ground, and, equally important it can not be stalled in the air These characteristics are of such importance especially to amateur fliers, that they will not be denied The autogyro has set standards of performance which airplane manufacturers will have to equal or else they will be superceded. Those who visited Langley could not fail to be impressed with the fact that real developments of the utmost importance have reached the stage where their practical application during the next few years is almost certain

//

Wind Cones

ONE OF the first things that a flier looks for when circling over an unfamiliar airport, is the wind cone, and nine times out of ten he has difficulty in finding it The usual trouble is not in the location of the wind cone nor in its size, but in the fact that it has become a sooty gray and is hard to distinguish from the roof or ground over which it is located A flier who is looking for a wind cone is not looking where he is going, neither is he getting into a pleasant frame of mind A little soap and water would be a great help

//

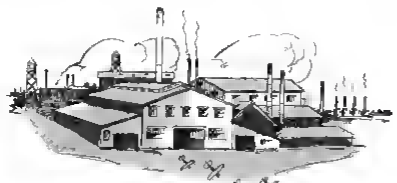
Frozen Capital

ONE HAS but to visit a few of the present day airplane factories to become convinced that the problem of economic airplane production is still a long way from a satisfactory solution It is, of course, admitted that the ever increasing selling market makes possible a certain amount of progress toward the ideal situation in any manufacturing industry, that of massed production and sales However, at present the demand does not exceed the supply to any perceptible degree, and therefore it behooves the airplane manufacturer to "look before he leaps." In other words, equip his factory in such a way that future production demands will not relegate all of that equipment to the scrap heap

It has often been stated that the automotive industry is an ideal pattern to be followed in the aeronautic industry Perhaps so in most phases, but from the standpoint of production rather than it being a matter of applying automotive production methods to the airplane, it is a matter of applying airplane production methods to the airplane And the question is what *are* airplane production methods? At present, no one is in a position to say, for no one knows what will be the exact status of the airplane ten or fifteen years hence Consequently the aeronautic industry is feeling its way along and building up a solid foundation for future endeavor and development Therefore, although the expenditure of great sums of money for all kinds of factory equipment to handle present day production may suggest progress, in a certain sense the wholesale expenditure of money for equipment is not economic progress for the near future may see changes in airplane production methods that will cause large sums of frozen capital to be tied up in obsolete airplane factory equipment

THE *Distributor* . . . WHO *HE IS* . . . WHY *HE IS* . . . *AND* WHAT *HE DOES*

By R. SIDNEY BOWEN, JR.



In keeping with the steadily increasing airplane sales volume in this country, manufacturers are now striving toward the establishment of their own individual national sales organization. The important part that the distributor plays in such an organization is dealt with in detail in this article

Who He Is—Why He Is—and What He Does.

THE DISTRIBUTOR in the aircraft industry, as in any other industry which caters to the retail buying public is the connecting link between the manufacturer and his retail sales outlets. Theoretically the distributor serves as a sort of field general for the manufacturer in that he protects and fosters the interests of the latter throughout a specific territory. In practice, however, he is or he should be, an independent party who has entered into a business contract with the manufacturer to handle the distribution of his products among that manufacturer's retail sales outlets—his dealers.

The reason for the existance of the distributor is, primarily, because of the fact that the manufacturer must of necessity, devote the major part of his effort to the producing of his product. In so doing, it stands to reason that he can not handle the many many details that enter into the national merchandising of that product. It is admitted that at present there are several airplane manufacturers in this country who are doing that very thing and, according to reports, with a fair amount of success. However, as time goes on the airplane market will increase to a size where the handling of all sales by the manufacturer will be but a form of "playing both ends toward the middle." A manufacturer can not possibly hope to defeat competition if he strives to handle both the manufacture of his product and the contacting of a national market. Realizing this, the progressive manufacturer selects individuals or companies to carry out his merchandizing plans in designated parts of the country. These parties are called distributors, and they buy from the manufacturer in quantity lots, at certain discounts off list price, for redistribution to the dealers, or in other words the actual retail sales outlets.

Because of the size of his territory and the size of the potential market that exists in that territory, it is impossible for the distributor to obtain the maximum amount of retail sales in that territory without the assistance of third parties. These third parties are, of course, the dealers and incidentally the actual contacts with the buying public.

The selection of his dealers is perhaps, the most difficult part of the distributor's job. Not difficult from the standpoint of finding dealers but difficult from the standpoint of selecting or developing *good* ones. As progress the dealers so progresses the distributor. Therefore it is up to the distributor to make few mistakes in the selection of his dealers, and to extend to them 100 per cent cooperation in all things pertaining to the business of merchandizing and servicing airplanes.

One of the first things of which the keen distributor makes sure is that the prospective dealer is financially sound enough to carry on in business after he has purchased a demonstrator. There have been cases of where a man set himself up as a dealer and then when he had obtained a demonstrator at a reduction off list price he forthwith went out of business. To off set such actions it is now the policy among distributors to charge list price for the first demonstrator purchased by the dealer.

IT STANDS TO REASON that the past business experience of the dealer must be taken into account by the distributor when making his selection. If a prospective dealer has had experience as an automotive dealer, it is altogether probable that he could very readily adapt himself to the aeronautic industry. And, of course if the applicant for a dealership is a former pilot or member of the aeronautic industry his knowledge of the game would make him an even more promising prospect.

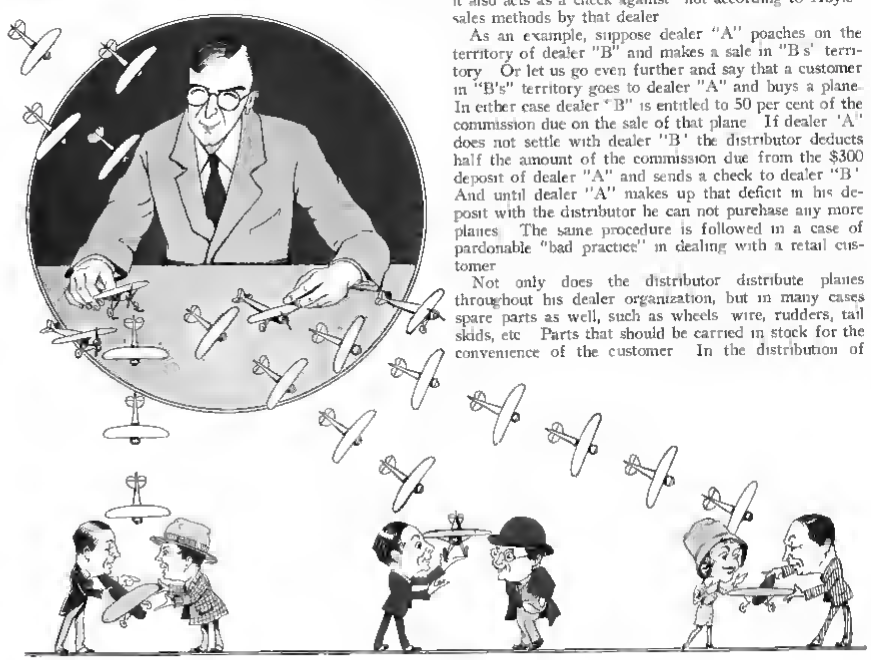
Another important point in the appointing of a dealer is the setting of the amount to be deposited with the distributor by the dealer as "evidence of good faith" as it were. The size of that amount seems to vary with different distributors throughout the country, and ranges from three to four figures. However, in determining that amount the distributor should bear in mind that the dealer is in business to make a living. To demand a major part of the dealer's working capital as standing evidence of good faith, is not helping him but hindering him in getting a good start. The deposits referred to are of course not regarded as deposits of planes on order.

Whether dealer territories are to be regarded as "open" or "closed" is another matter which is up to the distributor to decide. There are several opinions that one hears throughout the industry regarding the advantages and disadvantages of open or closed territories, and a few of them will be presented a bit later on. At this point perhaps the policies of a certain distributor who has closed dealer territories may be of interest and value.

THIS DISTRIBUTOR requires that each dealer upon accepting contract deposit with him the sum of $300 (in addition to deposits of planes ordered) upon which the distributor agrees to pay interest at the rate of six per cent per annum. Not only does the deposit of $300 serve as evidence of good faith on the part of the dealer, but it also acts as a check against "not according to Hoyle" sales methods by that dealer.

As an example, suppose dealer "A" poaches on the territory of dealer "B" and makes a sale in "B's" territory. Or let us go even further and say that a customer in "B's" territory goes to dealer "A" and buys a plane. In either case dealer "B" is entitled to 50 per cent of the commission due on the sale of that plane. If dealer "A" does not settle with dealer "B" the distributor deducts half the amount of the commission due from the $300 deposit of dealer "A" and sends a check to dealer "B". And until dealer "A" makes up that deficit in his deposit with the distributor he can not purchase any more planes. The same procedure is followed in a case of pardonable "bad practice" in dealing with a retail customer.

Not only does the distributor distribute planes throughout his dealer organization, but in many cases spare parts as well, such as wheels, wire, rudders, tail skids, etc. Parts that should be carried in stock for the convenience of the customer. In the distribution of



everything, from a bolt to an assembled plane, the distributor should take care not to over-stock the dealer. This can be accomplished by analyzing the dealer's territory and helping him to decide just how much equipment he can dispose of in that territory. And in addition to helping the dealer "size up" his territory, to keep contacting him and seeing to it that the dealer does not lie

A Wright "Whirlwind" powered Ryan BI

down on the job. Just at present there exists a tendency to do that little thing. One reason being that aerial service work offers lucrative returns. The wise distributor will encourage his dealers to take up aerial service work, and if possible establish a flying school, because of the added revenue obtainable. Yet on the other hand he will preach the advantages of linking up these "outside" activities with the selling of planes.

As a matter of fact, many distributors are now conducting flying schools themselves. But, as the manufacturers have been forced to give up similar practices and are referring applicants to their distributors, so will the distributors eventually be forced to abandon such work and pass it on to their dealers. The industry is young yet, in fact, has but started to scratch the surface of its merchandising problems. However, little by little the distributors are swinging into line and becoming regular distributors and not combined distributor-dealers. Until recently it was necessary for the so called distributor to dabble in everything aeronautical in order to make a living. But it won't be long now!

Reverting for the moment to the subject of open or closed dealer territories, it seems to be the concensus of opinion that closed territories are better than open

A Simon "Junior" fitted with a Warner "Scarab" engine

territories. It is felt that a greater number of sales can be made in a closed territory because of the fact that the dealer can devote his entire attention, unhindered and uninterrupted, to potential prospects within a definite area. If he is compelled to combat competition right in his own front yard, it is believed that he will rush helter skelter throughout the territory to pick up the "quick sales" before the other chap, instead of going after quantity sales in a steady and progressive way. To the majority, open territories are not as good as closed territories in that they do not permit efficient sales development, and in addition they do not permit the original seller of the plane to continue to contact the customer as he should be contacted there after. And the result is that additional and repeat sales are often lost, and the dealer cannot figure out future territory possibilities as accurately as he should be able to figure them out after a year's activity. In other words, open territories invite hit-or-miss selling instead of steadily increasing sales volume.

Those who do favor open territories state that a closed territory tends to cause the dealer to sit back and make the customers come to him, in view of the fact that he is the sole representative of a certain product in that territory. They feel that that is particularly true in the case of servicing. The dealer is the only one who handles genuine parts in that territory and so the plane owner must come to him. If he gets a new plane elsewhere the dealer gets credit for it anyway, so why exert one's self to dig up business that is bound to come his way? At least that is the way the open territory converts regard the subject.

However, if the territories are open, it is felt that the dealer will be caused to hustle after business else he will miss out on his livelihood and eventually be forced out of business. Sales competition, in the opinion of open territory converts, is what makes for greater sales volume.

There may be considerable truth in what the converts of open territories consider as correct merchandising procedure. It is true that open territories have been operated successfully in other industries. Yet on the other hand, it is possible for a wide awake distributor

A three engined (Wasp) Ford transport monoplane

to prevent, or eliminate dealer procrastination in a closed territory. This can be accomplished by a distributor *competing* with his dealers.

At first glance that may appear to be open territory sales procedure, but when one considers for the moment the way in which the distributor competes, it proves to be a horse of another hue.

Whether a distributor divides his selling area into closed dealer territories, or whether he permits "open season" the year around, he will himself do a certain amount of retail selling within his own immediate locality. To appoint a dealer nearby his own establishment would be just so much sales effort overlapping and customer contact repetition. And as a matter of fact, it is a good thing for the distributor to sell retail in his own locality, if for no other reason than the fact that he "gets the picture" as the dealers get it. In other words, by his own retail selling experience he is better able to understand and assist his dealers in the solution of their own problems.

Possessed with that retail selling experience the distributor can better gauge the market of each of his dealers, and set a minimum sales total for each dealer. Then if the distributor finds that a certain dealer is falling below the amount of business obtainable from his territory the distributor can send his own men in there to sell that market, and incidentally not credit the dealer for one single cent of business that the distributor obtains.

The results of such methods have a most telling effect upon the dealer in question. In the first place, the distributor proves to the dealer that the business does exist. Secondly, there is just that much money in commissions that the dealer loses. And third, it is more or less of a warning to the dealer that if he (the dealer) does not speed up his activities and produce more business the distributor will cancel their contract and appoint some one else. Of course, the distributor is in a position to cancel a dealer contract at any time, if the dealer does not live up to the terms of its agreement. And in flagrant cases of deliberate procrastination and falling down on the job by the dealer, it is sometimes best to break off business relations without any argument

A Fairchild 21 powered with a "Genet" engine

However a certain amount of procrastination is a common evil, and therefore the distributor should consider all sides of the case before taking such drastic action as that mentioned above. Often a little jacking-up of the dealer, or a temporary distributor "invasion" into the dealer's territory will bring about the desired results. In short, distributor competition with dealers does pay, and it is not the same as open territory sales procedure.

To maintain a working check on dealers and to contact them as they should be contacted, it is necessary for the distributor to have at least one man (preferably a pilot) "patrolling" the entire territory. The size of the distributor's territory and the number of dealers within that territory should determine the number of outside men the distributor need employ. These men, or that man (it may be the distributor himself) pay visits to each dealer at regular intervals and while there render any assistance needed. Such assistance may be the establishing of an inventory system, or the closing of a sale with an extra "difficult" customer or the planning and laying out of a local advertising campaign, etc. The duties of the distributor's outside men are tenfold, but it is through their reports that the distributor is able to "feel the pulse" of his territory. And feeling that pulse is very necessary to the distributor for it must not be forgotten that while the dealers are responsible to the distributor, the distributor is also responsible to the manufacture. What is sauce for the goose is sauce for the gander, as it were.

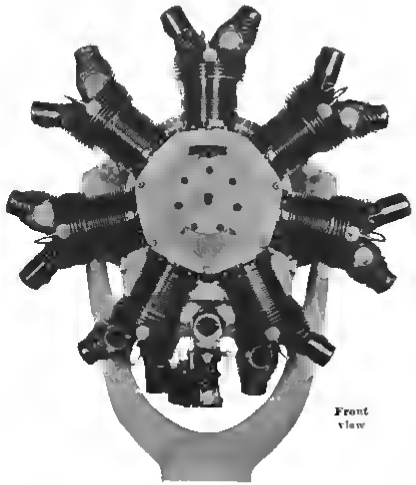
In addition to personal contact between the distributor's organization and the dealers, it is also beneficial to maintain written contact as well. This can be in the form of weekly sales letters containing information regarding general territory activities, special selling campaigns, booster campaigns, personnel news, and business tips etc. Or it can be maintained by the publishing of a dealers' house organ by the distributor. The manufacturer usually publishes a house organ, but it has proved beneficial for the distributors to publish their own individual house organ. These are much more personal and have a more direct appeal to the parties for whom they are published.

An American Eagle, Model A 929 fitted with a 60 hp. Lelland engine

Although no mention has been made of a distributor handling more than one airplane account, or in other words representing more than one manufacturer, it is not to be believed that such practice is not in vogue at the present writing. Thus far, few distributors have been able to make a worthwhile living out of handling just one manufacturer's product, and as a result have been handling more than one non-competitive accounts. However, airplane manufacturers are now coming out with complete lines of models to thoroughly cover a certain type of market, and it will not be long before a distributor will be compelled by the manufacturer to represent none other than his company. As a matter fact, a few manufacturers already are insisting upon individual distributor representation. Competition in the airplane industry is becoming so keen that concentrated sales effort is absolutely necessary and a multiplicity of similar accounts does not permit 100 per cent concentrated sales effort. Of course it is possible for a distributor to handle "outside lines" such as airport equipment, etc., just as an automotive distributor handles radio or automotive accessory accounts.

It is 100 per cent. sales effort that spells success for the distributor. And by that we mean 100 per cent co-operation with the dealers, by affording them every opportunity to make money, by giving them a good break on discounts, by helping them solve their individual problems, by keeping everlastingly after them for their own sake, and by treating the dealers as the distributor desires to be treated by the manufacturer.

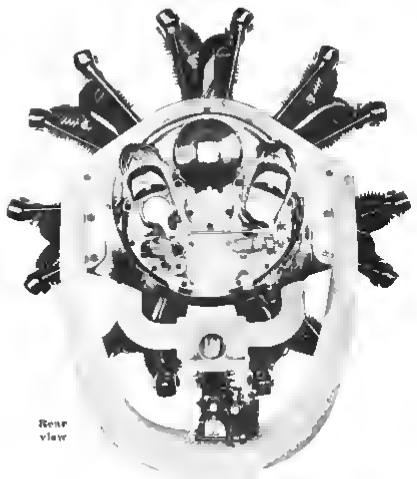
This is the second of a series of airplane merchandising articles. The third will appear in an early issue of AVIATION



Front view

THE *Continental* A-70

Seven Cylinder Radial Air Cooled Engine Develops 160 Hp. at 2,000 R.P.M.



Rear view

CONTINENTAL MOTORS Corporation, of Detroit, for many years builders of power plants in the automobile, truck, marine, and industrial unit fields, recently re-entered the aircraft industry with a new and interesting series of airplane engines, the first of which series was displayed at the second annual All-American Aircraft Show.

An interesting fact in connection with the model shown at the Show—a seven-cylinder radial air cooled engine, developing 150 hp at 1 850 r p m—is that this model will be made available later with geared drive and built-in centrifugal supercharger.

Although the seven-cylinder engine tentatively known as the A-70, has been announced as the first of a series, no information concerning others of the series is available at this time.

The present 150 hp type was developed under the direction of Robert Insley, head of the company's aeronautical department, who formerly was assistant chief of the Power Plant Section, United States Army Air Corps, at McCook Field, Dayton O. It utilizes a 5 to 1 compression ratio, has a bore and stroke of 4⅛ in., and a total piston displacement of 544 cu in.

Cylinders of the A-70 are built up with heat treated aluminum alloy heads screwed and shrunk to forged steel barrels, the bores being ground to very close tolerances. Each cylinder is secured to the crankcase with ten studs and nuts. Valve rocker boxes are cast integral with the cylinder head, the covers, of cast aluminum, being secured by means of studs and nuts. Both the "shrunk in" valve seats and the inserts for spark plug openings are of aluminum bronze.

Heat treated aluminum alloy is used in constructing the crankcase, the case being split on the center line of the cylinders. The forward main roller bearing and the ball thrust bearing are carried in the front half of the crankcase, while the rear half carries the rear main roller bearing and contains the cast-in induction manifold. Cam follower guides and the mounting bosses also are located in the rear section of the crankcase. A maximum of crankshaft rigidity is provided for by leaving ample space between the thrust and front roller bearing. A breather is located on the front half of the crankcase. Both main roller bearings are mounted in bronze liners and the thrust bearing in a steel retainer.

The full skirt plain cylindrical type pistons are heat treated aluminum alloy castings. The skirts are unusually long, the heads being thick to minimize heating and scuffing. Piston pins are secured in bosses by wire snap rings. Reliefs are provided at the vicinity of the piston bosses to avoid the possibility of seizing. The pistons use four rings, three located above and one below the pin.

HEAT TREATED chrome vanadium steel is used in the connecting rod assembly, the one-piece master and articulated rods being of "H" section, and completely machined. All link and piston pin bushings are of bronze. The master rod crank pin is a steel back, babbitt-lined bushing. Case-hardened link pins are secured in place by locking plates.

The crankshaft is constructed of two, heat treated, chrome nickel forgings, completely machined with counterweights riveted on. The shaft is parted at the rear cheek, where the crank pin is secured by a clamping bolt. The shaft is drilled throughout for lightness and plugged at the rear section and crank pin to form a passage for oil to crank pin and link pin gearings. Timing and starting gears are driven by a spline at the center of the rear portion of the shaft. Either S.A.E. No. 2 taper, or S.A.E. No. 20 spline propeller mountings can be supplied.

Exhaust valves are of the hollow stem, tulip type made of C.N.S. alloy. Intake valves are solid-stem tungsten steel. Two straight helical springs are used on each valve. Heat treated and forged chrome vanadium steel is used in the rocker arms, which are mounted on ball bearings. The valve tappet clearances are adjustable at the front end of the rocker. Push rods are of duralumin tubing with hardened steel ball ends, and are encased in light steel protecting tubes. The cam followers are of oil hardened chrome vanadium steel with case hardened rollers, pins and push rod cups. A special aluminum alloy bearing metal is used in constructing the cam follower guides. The cam ring and gear are of case hardened chrome vanadium steel riveted to a forged duralumin hub, the ring assembly being mounted on a bronze bearing and driven from the crankshaft timing gear by an intermediate gear mounted on a stud shaft secured in the gear case.

The crankshaft starter gear is mounted on splines in the center of the rear half of the crankshaft. The starter shaft gear is of equal size and meshes with the crankshaft starter gear above the crankshaft. Two magneto shafts, one on either side of the crankshaft, are forged with integral gears which mesh directly with the crankshaft starter gear. The crankshaft timing gear, which drives the cam generator, and pump shafts, is mounted on the crankshaft and is, itself, driven by the starter gear through a finely serrated clutch held in engagement by a screw at the end of the crankshaft. The generator shaft lies below the crankshaft and is driven by the cam intermediate gear. The pump shaft driving the oil pressure and scavenging pumps and tachometer drive at one end and the fuel pump at the other, is located transversely at the rear of the cam intermediate gear and is driven by helical gears from the generator shaft.

ALL ACCESSORY drive shafts are forged integral with their gears and run in plain bearings under full oil pressure, except the oil pump shaft, which is mounted on ball bearings. Except for the helical pump gears, these gears are of the straight spur tooth type built of oil hardened chrome vanadium steel.

The serrated clutch mentioned previously, makes for simple and accurate timing adjustments. By merely loosening the screw at the rear end of the crankshaft the clutch may be disengaged, which permits adjustment of the timing gears with reference to the crankshaft.

A standard S.A.E. generator mounting is provided to accommodate any approved standard unit. S.A.E. standards are also followed on the starter mounting. The starter shaft is equipped with both the three-jaw clutch and the internal starter spline to accommodate any type of starter. Cylinder heads are tapped for the installation of Heywood injection starter fittings.

Fuel mixture is provided by a single-barrel Stromberg carburetor and carried to the "horse shoe" intake manifold in the crankcase by a double intake pipe. A large hot spot area at the juncture of the intake pipe arms makes for complete vaporization. A valve operated from the cockpit controls the flow of heat to the hot spot. An exhaust ring, nose cowling (or N.A.C.A. cowling with integral exhaust rings) and radio shielding can be provided if required. A fuel pump can be mounted on an S.A.E. standard flange and provided with a coupling to the pump cross shaft.

The oil pressure and scavenger pumps are built into a single unit located at one of the cross shafts, near the bottom of the gear case. All accessory drive bearings, crank pin and link pin bearings are lubricated by pressure. A spray system lubricates the other parts.

Scintilla magnetos and B. G. spark plugs are standard on the engine. Among the notable features of the Continental engine is the fact that it may be set in the mounting ring without removing any accessory, piping or wiring, except, of course, those pipes or wires leading from the engine to the airplane proper.

Weight of the engine is 400 lb. with carburetor and magnetos, but without starter, generator, exhaust pipes or air intake heater.

Specifications supplied by Mr. Insley are as follows:

Designation	A-70
Cooling system	air
Cylinder arrangement	radial
No. of cylinders	seven
No. of strokes per cycle	four
Propeller drive	direct (geared model later)
Rated hp. and r p m. at sea level	160 hp. at 2,000 r p m.
Weight dry, without hub or starter	400 lb.
Weight per rated horsepower	2.5 lb.
Bore and stroke (in.)	4⅛x4⅛
Compression ratio	5 to 1
B. M. E. P.	116.5 lb. per sq. in.
Displacement (cu. in.)	544
Diameter of mounting ring	20 in.
Overall diameter	41¾ in.

THE *Inspection Section* OF THE *AERONAUTICS BRANCH*

By DONALD E. KEYHOE

THE GAME of hide and seek between Department of Commerce aeronautical inspectors and certain pilots and plane owners ended on March 1, when the old letters of authority went into the discard. Now, letters of authority are issued only *after* examination of applicants, and merely to serve until the license card is made out and forwarded.

But this does not mean that licensing trouble ended on that date. I have seen ample evidence of that—both in and out of Washington. I was sitting in the office of Gilbert Budwig, chief of the Licensing Section of the Branch, when a long distance call came for him.

Budwig listened for a moment and then glanced at a telegram which had just come in a minute before. The voice at the other end of the line continued to be raised in a furious complaint until it was distinctly audible several feet from the phone.

"Your inspector grounded me for no reason at all,' the unseen speaker declared heatedly. "He's simply hostile—one of those smart-alecks trying to stir up trouble."

Budwig picked up the telegram.

"The inspector says you have a badly leaking gas tank, a fire menace. Also that you haven't any pilot's license, though you are flying a licensed plane."

The aggrieved pilot seemed taken aback that Budwig had any information on the case. He plainly thought he had reached headquarters first.

"Why, that leak isn't anything at all," he retorted after a pause. "Anyway, I can fix it, but he won't let me take-off without a license. I've got one but I left it in New York. Had to start in a hurry."

"The inspector hasn't any way of knowing whether you have one," explained Budwig. "He wired in to find out, intending to let you go on if you did have one. I've had it looked up and I see you have one, but you ought to carry it. Too many people without licenses tell that same story."

"The inspector isn't hostile, he's merely carrying out his orders. Now if you'll fix that tank and two or three other things that the inspector says are wrong with the plane, we'll let you go ahead without the license till you get back to New York."

This certainly was a concession, but the man at the other end only muttered ungraciously as he hung up. This is only one of the many incidents that make up the routine of the Inspection Section. Two things are plain after listening to both sides of several cases. All pilots and owners are *not* out to co-operate with the Department in the effort to insure safety and thus promote the industry. And second, the life of an inspector is no bed of roses.

The last is apparent almost at once. Almost every one of the present inspectors has been through some narrow escapes while testing out applicants for licenses. One inspector was landed in a tree by an applicant when the engine cut out; another had a woman applicant bring a plane in upside down. Several have been put in power spins close the ground, and others have been stalled at dangerously low altitudes, usually with the applicant frozen onto the stick. One inspector was almost hurled out when an applicant did a snappy half roll when told to make a 60 deg. turn.

But this is all in a day's work—they expect that when they sign up with the Department. But when the very ones who pull such tricks complain the loudest, asserting they are victims of spite and persecution—that is another matter. One of the first troubles comes from exaggerated time. Every one in the game knows that there is a quite common tendency to boost "hours in the air." If all the men who claim 5 000 hrs. were to be lined up together they would reach from—well, I'm no statistician, but there would be enough to supply a caretaker for each beacon light across the Transcontinental Route—and then some. (And a few of these "aces" would be a lot better off if they were put down as caretakers and so would the industry.)

THIS MAY SEEM an exaggeration in itself, but there are cases on the Department's records where men have multiplied their real time by ten or more. One "airman" passed in his community for a World War "ace" until a Department of Commerce inspector turned up and the "ace" decided not to take his test for a license. Later, he cracked up someone's plane on what was and still is believed by many to have been his first solo.

"We have to go by the flying itself," Budwig explained in regard to this. "Of course, the applicant must have the time required by the Regulations, but if a man claims 550 hr. and he flies like one with 50 hr., he gets a 50 hr. license. We do not hand out the transport license until we are sure the man deserves it. So it doesn't do them any good to misstate their flying time.

"At first, there were a lot of kicks about 'hard-boiled' inspectors when applicants didn't get by," Budwig went on. "And there may have been such cases. But we impress on every inspector now that we have enough trouble without looking for it, and to use common sense. We tell them to try to help, not hinder the game. No inspector lasts long with the Department if he goes against those directions.

"And the industry seems to appreciate it, in general. These inspectors are veterans—Army and Navy pilots, ex-barnstormers, men who know the game and are in sympathy with the pilots. The industry respects them and now there are very few complaints about hostility. Whenever there are, they invariably turn out to be attempts to cover up some fault on the other side. Ordinarily, the trouble-makers try to get around the Regulations by some trick rather than protest against the inspector's decision.

"One man tried to take a flight test for another but when the inspector took a second look and said:

"'You're John Jones, are you?' The fake applicant left in a hurry.

"Until March 1, pilots and owners who didn't care to be tested or have a plane inspected, used to run away, but now they're outlaws if they haven't licenses or letters of authority *after* examinations."

THE ITINERARY SYSTEM has helped applicants greatly, as well as the Department. Budwig explained. Applicants now receive routing lists showing three cities where inspectors can be found at almost any week-day in a month. In this way, the applicants can arrange their affairs so that they will have to travel the shortest distance, if any, and lose least time in taking examinations and tests.

In carrying out these itineraries, inspectors often work overtime, flight-testing all day at the airport and then gathering all the applicants at a central spot in the evening for the written tests. This results in three times as many finished cases as would be the situation if each one were completed singly. There are many instances where inspectors have put 15 to 20 men through flight tests in a day, examined them at night, graded the papers, and signed letters of authority for those passing these tests, so that they could go on in the morning, free to operate without waiting for the actual license card from Washington.

In testing applicants, fullest consideration is given to the man to whom a license means "bread and butter." This is impressed on inspectors, though most are old barnstormers and would have it in mind anyway. Of course, an inspector cannot re-examine a pilot within the 90 day period, but if he sees that the applicant is skilled but temporarily "rusty" he can continue the examination after a short interval, while he tries out other applicants. This is extremely fair, for often a pilot has a position waiting, dependent on his having a license. A little practice on the maneuvers in which he is rusty will enable him to pass without waiting for the 90 days to pass. Of course, this can be done only in cases where the inspector knows the applicant has had the necessary experience to become satisfactory with this little brushing up.

By this, it is not meant that new men in the game—the man with a few hours—is not shown proper consideration. An instance will show the contrary to be true. As chief inspector, Budwig was one day testing applicants at a certain field. A young fellow asked to be given the limited commercial test. He did not own a plane but had an opportunity of extending his flying time at the field, providing he could get the limited commercial license, which would enable him to carry passengers for the company on rush days.

He was to take his test in one of the company's planes. But the chief pilot for the company wanted Budwig to take the responsibility for the plane. Budwig refused, but suggested that the test pilot check out the applicant to see if he were safe, or else just ride with him while he flew for the test. After some hesitation the chief pilot agreed. But after a few minutes in the air the plane hurriedly landed.

"No good," said the chief pilot abruptly, climbing out of the plane and walking off.

The applicant came over to Budwig.

"He can't know whether I'm any good or not," he said earnestly. "Every time I went to turn or get ready to make a landing for you, he'd grab the controls. He never gave me a chance to show you."

Budwig was impressed by the boy's evident sincerity and manner. He talked with another local pilot and then decided for once to assume responsibility.

"I'll fly with you," he told the applicant.

They took off and in a short time the applicant showed he was quite capable and fully ready for a limited commercial license. When Budwig came down he called over the test pilot and asked him to get into the plane. And here came the surprise—the chief pilot for the company proved to be a complete "washout"—he was nervous, too high strung—and unsafe in the air. His transport license was at once revoked.

The private's pilot's license is carefully handed out—contrary to general opinion. As it is good for a year, handing it out to a 10 hr. pilot may create a dangerous situation. If he has no plane with which to practice, he will soon be "stale" although he may have been perfectly all right when he took his test. He may then use his license to impress some inexperienced plane owner who does not realize the tremendous difference between "private" and "transport" on a license card. And disaster may be the result.

THIS IS ONE reason for cancelling applications of men who do not have planes and have no way to get one for a flight test. Obviously it is best, both for the industry and the pilots, that licenses are not given out to those who fail to "keep their hands in." Not that it is possible to insure this, but this is one point which inspectors are told to keep in mind, especially in regard to the private license.

Although licensing takes up most of the time of the inspectors, they have other duties. There are violators of the Regulations and Air Traffic Rules who must be followed and either warned, or reported to Washington in case of "repeaters" or flagrant violators. Inspectors also ground guilty pilots in bad cases, then reporting the details to Washington, where it is decided whether fines or revocation of licenses will be inflicted. Hardly ever is a first offender fined, unless he has committed some serious breach.

For a while, stunting with paid passengers was continued in spite of the Air Traffic Rules, but this is now on the decrease. One pilot after nearly being fined by

the Department for this, put up a sign at his airport "Stunt Hops—$5 apiece—$500 for the Department of Commerce, $5 for the pilot"

Often, an inspector finds it difficult to catch up with some persistent violator. So a small part of the month is sometimes left open for "free lancing," otherwise a guilty pilot or owner might easily check off the inspector's itinerary and be sure to stay in the opposite part of his district and a few jumps ahead.

Investigation of accidents is another duty assigned the Inspection Section. And here is where more than an ordinary amount of trouble comes. It is natural for pilots to try to cover up their own carelessness, and if the pilot at fault is a "good scout" his brother fliers will suddenly have extremely faulty memories when questioned.

In one case a licensed pilot reported a crash with a licensed plane, giving all details of the crash, but still the inspector suspected something wrong. He did a little detective work on the side and found to his surprise that the licensed pilot had been a long ways off when the plane crashed. It soon developed that an unlicensed pilot had been flying the plane, and knowing he was subject to a fine of $500, he made some kind of an agreement with the licensed pilot to take the blame.

IN CONNECTION with crashes a new and sinister business has sprung up. Certain unscrupulous hangers-on of the industry have been buying wrecked airplanes in order to get the license numbers and the manufacturer's nameplate. They then build up these wrecks, often with no regard for anything but the appearance of safety, and then peddle them to unsuspecting buyers, ordinarily newcomers to the game.

Of course the Department will not license these planes and it has to refuse to inspect them for it has no way of knowing what lies under the fabric, or what kind of work was done in rebuilding. The buyer is stung. Then there are a few cases in which crashes were not reported and the rebuilding covered defects not easily discernible. Now the inspectors have to be more on the lookout than ever. One of these "flying coffins" crashed on its first flight after rebuilding, the wings folding up and a fatal crash following.

Some time ago an inspector was requested to license what appeared to be a brand new airplane of a standard type, for which an approved type certificate had been issued. Now it happened that an inspector had been assigned to the factory building that particular type of plane, and had been given a block of numbers for all planes built there. So this plane the inspector was asked to license should already have had a number. He checked up and found that the plane had never been within hundreds of miles of the factory in which it was supposed to have been built. From wing to tail-skid it was an imitation, dangerously weak constructed of cheap materials, but finished so nearly like the real model that more than a casual glance was needed to detect it. The average newcomer to the industry would have bought it gladly—for it was offered at a reduced price.

As a result of this, inspectors are being sent whenever possible to all A. T. C. factories, at least those in large production. Blocks of numbers are kept there so that any new, unlicensed plane of that make, appearing elsewhere, will be immediate evidence of fraud. Eighty per cent of the output of licensed planes are licensed at the factories. These are permanent numbers, and the usual mixup caused by temporary numbers and later changes is thereby avoided.

FIELD INSPECTORS must be on the lookout not only for such "bootleg" planes, but inferior wings, control planes etc. a number of which have been manufactured secretly for several well-known popular makes of airplanes. The prices are much less than the bona fide stock—and much less safe. Some plane owners anxious to repair a crash without reporting it to the Department, hastily secure necessary parts, and sometimes get these inferior products without knowing it. Some, with no intention of flying in the rebuilt planes themselves, buy the poor stock fully aware of the danger. If the inspector knows of the crash he is on the watch for these low grade parts. Sometimes owners repair what they consider minor damages, rebuilding in good faith, but still with no intention of reporting the crash and perhaps waiting a short time for the inspector to arrive. There have been so many instances of this, that inspectors now look over every plane they give periodic examinations, or those they inspect for other reasons, looking for difference in the sheen of the fabric on the wings. Frequently they will note such a difference and will cut into the wing, finding a badly broken spar has been repaired incorrectly. In one case, the next ordinary strain, even a strong bump in the air, would have caused failure of the wing and probably a crash.

Factory licensing is reducing a great deal of this trouble. At first, factory inspectors were not received kindly, but after several manufacturers had been helped to improve their products they ceased to complain. Flight testing was another stumbling block. When planes were turned down strong objections were made. But in one case, at least, the objection soon ceased. The inspectors insisted that the manufacturer's own test pilots fly the new plane and put it through the required maneuvers after the builder said he thought the test had not been "fair."

The manufacturer's pilots took off for the test—and a few minutes later they were forced to "bail out" at top speed to save their lives when the plane refused to come out of a spin. Yet this was the plane which had been declared airworthy by its manufacturer, and ready to place on the market.

It would be an ideal situation if the aviation industry were free from sharpers, inexperienced pilots and builders and irresponsible men. But like any big and growing business it has its share, perhaps more now than later because of the tremendous popular appeal of flying.

As long as there are unscrupulous and careless men in the game there must be an organization to hold them down as much as possible. The Inspection Section of the Department of Commerce is that organization. The inspectors are its watchdogs. If occasionally they happen to tread on the toes of an innocent individual in trying to catch a dozen offenders, remember that without these inspectors that same innocent individual would not have a prayer. He'd be swamped by the crooks that would pour in.

And finally—the inspectors are getting pretty good at picking the right toes to step on!

This is the fourth of a series of six articles prepared by Mr. Keyhoe dealing with the Aeronautics Branch, Department of Commerce. The fifth will appear in an early issue.—Ed.

Fourth Annual ENGINEERING RESEARCH CONFERENCE

By LESLIE E. NEVILLE

EVERY SPRING for the past four years representatives of the aeronautic industry have visited Langley Field, Va., to see and hear of the work being done by the National Advisory Committee for Aeronautics. Each year an increasing number have made the trip and on this year's visit, which took place May 14, the N.A.C.A. was host to more than 200, almost twice as many representatives of commercial airplane manufacturers, accessory manufacturers, bankers and reporters than attended last year.

Since last year's visit comparatively few large additions have been made to the equipment. During the coming year it is planned to start construction on a water basin to test models of pontoons and flying boat hulls, and possibly a wind tunnel of more than 100 ft. in diameter will be laid out. Much of the work which had been outlined at the previous year's conference had been completed, but certain fundamental research problems, such as the distribution of pressures on airplanes during various maneuvers was still being systematically studied. On the whole it would seem as if the work of the past year had been more fruitful of results directly applicable to commercial aircraft than was the case in previous years. However, the N.A.C.A. has been seriously handicapped this year due to the fact that several of its personnel have left the field of research in order to go with various manufacturers.

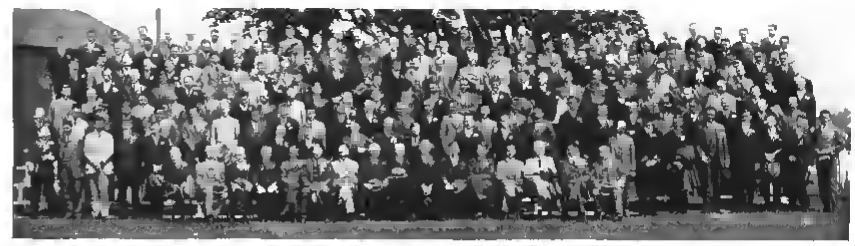
The most important work which was done during the year was that on the N.A.C.A. low drag cowling for radial engines. This work which was described in N.A.C.A. Technical Reports Nos. 3f3 and 3f4 and in the Nov. 17, 1928 and Feb. 16, 1929, issues of AVIATION, is now completed and the 20 ft. wind tunnel is now being used for the testing of propellers at such speeds that the velocity of their tips exceeds that of sound.

The visitors were shown a Curtiss D12 engine turning a metal propeller at a speed of 2,600 r.p.m. in the large tunnel. As soon as the tips reached a speed in excess of 900 ft. per sec. the noise became terrific. Diagrams were posted to indicate to the spectators the behavior of the efficiency curve for tip speeds in the range of sound. When the tests are completed it is planned to use the giant tunnel to test the effect of the interference of various parts of the plane with each other.

RESEARCH at the Langley Field laboratories falls into two general groups, that of the aerodynamic and power plant divisions. Results accomplished during the past year and the tentative program for the future were outlined during the morning sessions by Elton W. Miller, chief of the aerodynamics branch, and Carleton Kemper, chief of the power plant branch. The session was opened by Dr. Joseph S. Ames, chairman of the N.A.C.A., and conducted by Henry Reid, engineer in charge of the Langley Field laboratories.

In the aerodynamic division, as outlined by Mr. Miller, one of the important studies is the determination of pressure distribution on the various parts of an airplane under accelerations resulting from various maneuvers in flight. A specially designed multiple manometer is used in this work and provides a permanent record of the pressure at a large number of points on the surface of the airplane. The research has been extended to include the fuselage as well as the wings and tail of a PW-9 pursuit plane. This is now under way. Later the work is to be extended further to the investigation of Douglas planes. This work is being conducted by J. W. Crowley and Pilots Carroll and McAvoy.

Tests also are under way to determine the water pressure distribution on a seaplane float bottom and thus far



A group photograph of the representatives at the Langley Field Conference

it has been found that pressures are higher at bow, step and stern than at other points A comparison of the action of oleo and rubber landing gear shock absorbers is also under way making use of a special drop test rig

The general problem of safety in low speed flight is being studied exhaustively in the atmospheric tunnel under the direction of Montgomery Knight Pressure

Orville Wright (left) and H F Pitcairn (right) standing beside the Autogiro

distribution tests are now under way on some 40 types of biplane cellules, having various degrees of stagger, stagger-chord ratio and gap In this tunnel studies are being made to determine the possibility of increasing efficiency through boundary layer control by the use of pressure and suction slots in various positions and of different widths

IN AN EFFORT to determine which planes spin normally and which have a tendency to "flat" spin, experiments are being conducted to learn the effect of mass distribution on the spin A refrigerated tunnel for ice formation studies also is in operation

The variable density tunnel, which was destroyed by fire in 1927, has been rebuilt and a research program has been started Preliminary tests indicate that there is less turbulence than in the former tunnel The high speed tunnel which is operated from the discharge of the variable density tunnel, and which provides air velocities above that of sound, is being used to determine pressure distribution on a propeller section An ingenious arrangement of manometer tubes is employed to obtain visible and photographic results in this work Turbulence and cavitation also are being studied in water channel and tank apparatus in the same building These experiments are directed by E N Jacobs and John Stack Preliminary tests in the variable density tunnel indicate that the tunnel will serve its purpose, which is the elimination of error by the use of full scale Reynolds number One of the first investigations was the study of pressure distribution over the R A F airfoil with Handley Page Slots

In the 20 ft Propeller Research Tunnel, under the direction of Donald Wood investigations have been made of the effect of corrugations above and below the normal section of the wing Tests also have been made to determine the most desirable position for the nacelle with reference to wing and it was found that, on a number of combinations, the drag was lowest when the nacelle was placed in the wing with uninterrupted flow over the upper surface Slipstream effect was not considered however in these tests and it is planned to extend the investigation to include this important factor

The activities of the power plant section, as outlined by Mr Kemper, consist mainly of the work on oil engine and supercharger development This section also conducted the tests to determine the cooling characteristics of a radial engine with N A C A cowling

A comparison of the Roots blower and turbo type superchargers on a DH-4 biplane was conducted but the results were not considered accurate as the Roots blower employed had excessive impeller and casing clearances.

THE SPRAY photography apparatus which takes 25 consecutive pictures at the rate of 2,400 per second is being used to investigate the problem of injection lag and the effect of air turbulence on spray penetration Fuel spray distribution and air flow also are being studied Effect of load and speed on engine performance has been studied and maximum cylinder pressure has been shown to be a factor in determining engine performance A device to study supercharged engine valve timing also was shown to the visitors

At the afternoon session an opportunity was afforded guests to suggest various research problems A number of suggestions were made, most of them being along the lines of work already started Among the suggestions made were: extension of the structural investigation to commercial types; measurements of total load and load distribution in cantilever monoplanes, extension of the

The Packard Diesel powered Stinson monoplane at Langley Field

investigation on cowling and nacelle position to the biplane cellule; study of lateral stability below the stalling point; compilation of data on pusher propellers, cowling of tandem engines, most efficient position of tractor and pusher propellers with reference to leading and trailing edges of wings, flat and normal spins, hull lines of flying boats, and aerodynamic interaction of the various parts of an airplane and development of a simplified formula for center of pressure determination Speakers included E P Warner, Lessiter C Milburn, Sherman M Fairchild, Ivan H Driggs, H C Richardson, L M Woolson Temple Joyce and Harold Pitcairn

Following the conference, visitors witnessed the flights of the Pitcairn Autogiro and a Stinson Detroiter monoplane powered with the new Packard Diesel engine The Autogiro was piloted by Harold F Pitcairn, who is to produce this craft under license in this country; Captain L M Woolson and Walter Lees flew the Diesel powered airplane on its first cross country flight from Detroit to Langley Field and during the demonstration at Langley

AIRPLANE DESCRIPTIONS

Parks Biplanes

TWO biplanes of the three place, open type are now being produced by Parks Aircraft Inc., Parks Airport, St Louis, Mo The planes are conventional in design and differ mainly in power plants. The P-1 model is powered by a Curtiss OX-5 engine remodeled by the Parks process and the T-2 model can be furnished with Whirlwind Five, Axelson, Comet or other radial engines

Both planes have fuselages constructed of welded steel tubing and wooden wing structures Fabric covering is used for fuselage and wings in both cases

The Parks P-1 has an overall length of 24 ft 1 in, an overall height of 9 ft. 4 in., an upper wing span of 29 ft 8½ in and a lower wing span of 28 ft 2½ in The weight of the plane empty is 1,105 lb the useful load 735 lb, pay load 340 lb and gross weight 1 840 lb The

A side view of the Parks P 1 Biplane

craft has a high speed of 102 m p h a landing speed of 34 m p h and a cruising speed of 90 m p h The rate of climb at sea level is 550 ft per min and the service ceiling 13 000 ft

The Parks P-2 has an overall length of 23 ft 6 in an overall height of 9 ft. 3 in., an upper wing span of 30 ft and lower wing span of 28 ft. 6 in The weight empty is approximately 1 430 lb, useful load 970 lb pay load 470 lb and gross weight loaded 2 400 lb The high speed is 120 m p h, cruising speed 105 m p h landing speed 38 m p h The rate of climb at sea level is 820 ft per min and the service ceiling 14 500 ft A modified aeromarine 2 A airfoil section is used in both planes Ailerons on both upper and lower wings of the P 1 are operated by direct push and pull rod controls, insuring positive action to each In the Parks P-2 the double ailerons are replaced by a single Frieze type on the lower wing only A landing gear of the spreader bar type has been selected for the P-1 because of its lightness, ruggedness and assurance of economy for training operations. The P-2 has a conventional split type landing gear highly developed to insure maximum of strength and lightness Axles are heat treated to a tensile strength of 150 000 lb per sq in which gives ample strength The tail skid has been developed particularly to stand up in use on rough runways and rocky ground It is also heat treated to a tensile strength of 150,000 lb per sq in and is fitted with a cast manganese steel shoe designed with a deep fin to resist ground looping The tail skid unit is hinged in such a manner that landing shocks on the fuselage are reduced to a minimum

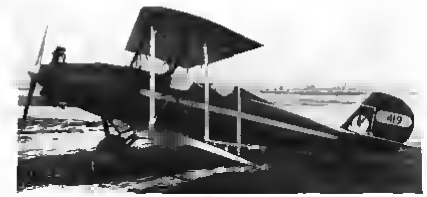
The radiator on the P-1 is placed out of the pilot's way beneath the fuselage The engine mounting is exceptionally light and strong and is welded to the fuselage All fuel oil and water lines are connected in accordance with Army specifications The fuel supply is indicated by an electrical fuel gage operated by a single dry cell

Kinner American Eagle

HIGHLY satisfactory performance and maneuverability are attributed to the Kinner powered American Eagle biplane, manufactured by the American Eagle Aircraft Corporation Fairfax Field Kansas City Mo This craft is a three-place open cockpit type, suitable for flight instruction, aerial taxi work and commercial or sport service

The Kinner powered American Eagle has an overall length of 25 ft 1 in, a wing span of 30 ft and a height of 8 ft 4 in The weight of the plane empty is 1 219 5 lb., the useful load 725 lb and the gross weight 2 041 lb The high speed is 105 m p h, and the cruising speed 95 m p h The climb in the first minute is 900 ft. and the service ceiling, 14,000 ft

The fuselage is constructed throughout of welded steel tubing This material is also used in the tail unit structures An undercarriage of the split axle type is provided The wings are constructed of airplane spruce and, as in the case of the fuselage are covered with fabric The area of the upper wing including ailerons,



The Kinner powered American Eagle Biplane

is 160 sq ft and that of the lower wing including ailerons is 140 sq ft Wings are wired for navigation lights

The seating arrangement is conventional, two persons being accommodated in the forward cockpit and one in the rear Dual controls are provided The instruments include tachometer, altimeter, and oil pressure and temperature gages

A gasoline capacity of 42 gal and an oil capacity of 5 gal are provided, affording a cruising duration of 5¼ hr The cruising range is about 500 mi

Davis Monoplane

A WING of unusual design for a light plane is one of the features of the Davis Monoplane built by the Davis Aircraft Corporation, Richmond, Ind. This craft is a two-place tandem type, having as standard power plant, the LeBlond Sixty (5D) radial air-cooled engine. The plane, however, is stressed for power plants up to 300 lb. in weight and the engine mounting is standard for either the LeBlond 60 or the LeBlond 90 engines. Two airfoil sections having different characteristics are employed in the design of the wing, which comprises two panels and a center section. A Clark "Y" profile is employed in the center section and at the wing roots. This section is merged into a Gottingen 387 for a portion of the semi-span at the lift struts and is again modified to a Clark "Y" section at the wing tips which are tapered. Spars are of laminated spruce, box type, and ribs are of rounded channel section duralumin. Lift struts are of the "V" type. The plane has a wing span of 30 ft. 6 in., an overall length of 18 ft. 6 in. and a height of 7 ft. The weight of the craft empty is 770 lb., the pay load 350 lb. and the disposable load 540 lb., giving a gross weight loaded of 1,300 lb. The fuselage is of conventional de-

A front quartee view of the LeBlond powered Davis Monoplane shnwing the nnnsual wing design

sign, being built entirely of welded steel tubing and rigidly trussed. Seats of the bucket type, upholstered, are arranged in tandem in separate cockpits. A split axle type of landing gear, constructed entirely of chrome molybdenum steel, is placed well forward of the center of gravity of the plane to minimize the possibility of nosing over in landing. The 26 by 4 in. wheels have a 6 ft. tread.

Steel tail surfaces having tubular spars and edges with sheet steel ribs are employed. All joints are welded and the spars are reinforced where controls are attached. At the left of the pilot in the rear cockpit is the stabilizer adjustment control. This control provides a range of four degrees plus and two degrees minus. Fabric covering is used throughout. All metal members are wrapped before covering.

Controls are of the conventional stick and rudder bar type and are dual so that either occupant may fly the plane. Controls in the front cockpit can be removed however, when the plane is not to be used in instruction work. Steel tube push-pull rods and bell cranks are used in the aileron and elevator controls. The rudder control employs flexible cables running direct from the rudder bar to the rudder without the use of pulleys.

A 25 gallon gasoline tank is built into the center section of the wing and feeds by gravity to the engine. The tank is constructed of welded sheet aluminum. An oil tank of 3 gal. capacity is located in front of the fire wall just over the engine mounting. Sheet aluminum cowling is employed for the engine compartment and for the cockpit. The front cockpit is accessible through a door on the left side and by steps conveniently located. Steps are also provided for the rear cockpit. Both cockpits are upholstered in leather and plywood is used for flooring.

Since it is intended that the plane be flown from the rear seat all instruments are placed on the rear instrument board. A Consolidated unit panel containing an altimeter, tachometer, oil pressure gauge and oil temperature gage is provided and a storage battery can be furnished as optional equipment. The front blank instrument board can be replaced by a duplicate of that in the rear cockpit if desired.

Stearman Coach

DESIGNED primarily to meet the demand for the individual owner, the Stearman Coach is to be produced in the near future. In actual tests, the plane, which is powered by a Wright R-975, 300 hp. New Whirlwind engine, attained a high speed of 135 m.p.h. The cruising speed is 115 m.p.h. and the landing speed 47 m.p.h. A rate of climb (sea level) of 900 ft. per min. and a service ceiling of 16,000 ft. also have been obtained.

The Stearman Coach is a cabin biplane having the upper wing supported on struts above the fuselage and the intervening space enclosed in glass providing 360 deg. visibility in the horizontal plane. The craft has a weight empty of 2,565 lb., a gross weight of 4,270 lb. and a pay load of 780 lb.

Conventional parctice is followed in the construction of the plane. Three fuel tanks, two in the wing having a combined capacity of 50 gal. and one below the floor having a capacity of 70 gal., are provided. An engine driven pump feeds the wing tanks from the main tank and an auxiliary hand pump also is provided. The oil capacity is 12 gal.

Instrument equipment is complete and includes air speed indicator, tachometer, altimeter, flight indicator,

The Stearman Coach powered by an R-975 Wright "New Whirlwind" Engine

rate of climb indicator, oil pressure gauges and clock. These instruments are grouped on an indirectly lighted control board. Landing lights, flares, navigation lights, generator and electric inertia starter are furnished. Side by side dual controls also are installed.

The Stearman Coach is attractively finished. The interior is provided with comfortably upholstered seats, heaters and other conveniences. A large baggage compartment is entered through doors in the structure

Golden Eagle "Chief"

THE Model 801 "Chief" is a refinement of the original Golden Eagle monoplane built by the R. O. Bone Co., Inglewood, Calif. It weighs 840 lb. and is powered with a 90 hp. LeBlond engine. Performance tests showed an initial climb of 1200 ft. per min. with full load, top speed of 125-135 m.p.h., a landing speed of 30 to 35 m.p.h. and a ceiling of 15,000 ft.

A low drag cowling of N.A.C.A. type has been fitted around the LeBlond engine, one of the installation features being that there is no internal cowling forward of the firewall in the fuselage.

The wing of the "Chief" is built in two panels mounted to the fuselage by inverted V cabane struts. Wing struts are of the lift type and are both attached to the same longeron fitting in order to permit easy access to the passenger compartment. Split axle landing gear is standard on the new model and has been especially well faired to reduce resistance.

Aluminum bucket seats accommodate the standard parachute pack and dual instrument boards are fitted, as well as dual controls. Navigation lights are also standard and a streamlined headrest is provided behind the pilot's seat.

Ailerons are of the Frize type controlled by steel torque tubes, elevators are controlled by push and pull tubes, rudder by conventional horn and wires. all surfaces have been increased in size for maneuverability.

A large baggage compartment is provided inside the fuselage and in rear of the pilot's compartment. Both

A front quarter view of the LeBlond powered Golden Eagle "Chief" showing N.A.C.A. cowling

cockpits are upholstered in black imitation leather. The wings, fuselage and tail surfaces are finished in gold, with nose cowling, body striping, headrest, wheels and struts in black.

Specifications of the Golden Eagle "Chief" as submitted to AVIATION are as follows:

Wing span	30 ft. 6 in.
Chord	5 ft. 6 in.
Length	20 ft. 6 in.
Height	7 ft. 6 in.
Landing gear tread	7 ft. 2½ in.
Airfoil	Clark-Y.
Engine	LeBlond 90 hp.
Propeller	California—Wood
Weight of plane empty	840 lb.
Disposable load	560 lb.
Gross wt. loaded	1400 lb.
Wing loading	8.5 lb. per sq. ft.
Power loading	15.5 lb. per hp.
Fuel capacity	40 gal.
Oil capacity	4 gal.
Cruising radius	500-600 mi.

"Air Boss" Biplane

INTERCHANGEABILITY of parts combined with conventional construction are the general characteristics of the new "Air Boss" biplane which is offered by the Southern Aircraft Corporation of Birmingham, Ala. The standard power plant of the Air Boss is the Curtiss OX-5 engine, but the craft is designed for other power plants in the same horsepower range.

The Air Boss has an upper wing span of 32 ft. 4½ in., a lower wing span of 30 ft. 9 in., a length of 20 ft. 3 in.

Side view of the OX-5 powered "Air Boss" biplane developed by Southern Aircraft Corp.

and a height of 9 ft. 5½ in. The high speed is 90 m.p.h. and cruising speed 110 m.p.h., while the landing speed is 30 m.p.h. In tests the plane was shown to have a rate of climb of 1,000 ft. in the first minute and a ceiling of 17,000 ft. The plane has a weight empty of 1,350 lb., a useful load of 850 lb. and a gross weight of 2,200 lb.

Chrome molybdenum steel tubing is used exclusively in the fuselage construction of the Air Boss, and wood is employed in the wing structure. Ribs are of plywood with spruce caps forming I beam sections and a strong plywood covering is used on all leading edges. Lower wings have wide walkways, direct aileron controls, enclosed fittings and Frieze type ailerons. The wings are wired for navigation lights. Double stream line wires are used in the external bracing. Double drag wires are used in the internal bracing. Fuselage wings, control surfaces, landing gear and other major units are all jig built. Arrangement of controls in the cockpit has been given careful attention and well designed windshields afford protection for the pilot and passengers. Both vertical fin and horizontal stabilizer are adjustable in flight. The pilot's seat is also adjustable. Double throttle control and instruments as required by the Department of Commerce are provided. The rudder pedals are equipped with compensating tension springs. The specifications, according to the manufacturer, are as follows:

Length	23 ft. 3 in.
Upper wing span	32 ft. 4½ in.
Lower wing span	30 ft. 9 in.
Height	9 ft. 5½ in.
Chord—both wings	60 in.
Maximum speed	110 m.p.h.
Cruising speed	90 m.p.h.
Cruising range	8 hr.
Landing speed	30 m.p.h.
Ceiling	17,000 ft.
Rate of Climb	1,000 ft. in first minute
Gross weight	2,200 lb.
Useful load	850 lb.

GENERAL NEWS

General Motors Acquires Control of Fokker Concern

Report Bendix Firm Interest is 25 Per Cent

NEW YORK (N Y)—By obtaining 400,000 shares of Fokker common stock—a 40 per cent interest in the firm carrying with it control by virtue of the fact that remaining stock is scattered—General Motors Corporation has now entered the aeronautical field The announcement was made by James A Talbot, chairman of the Fokker Aircraft Corporation board who stated that in payment, General Motors is turning over to the Fokker firm all of the capital stock of the Dayton-Wright Company assets of which include McCook Field Dayton Ohio, which was formerly used by the Air Corps as an experimental base, a number of patents, and cash assets of nearly $6,500 000

In Accessory Field Through Bendix

The entrance into the aero industry is supplemented by the General Motors interest in the accessory field through association with the Bendix Aviation Corporation, formation of which was recently announced by Vincent Bendix president It is said that General Motors owns 25 per cent of the stock in this company

Anthony H G Fokker, famed designer and builder of planes and a large stockholder in the Fokker organization, will continue with the firm in charge of engineering and design according to Mr Talbot The present personnel is to continue with the operation of the Fokker company, he said, with additional personnel from General Motors

Besides Mr Talbot, principal directors of the Fokker Aircraft Corporation are Harris M Hanshue, of Los Angeles, head of Western Air Express and president of Fokker and T C Gregory, San Francisco attorney H A Reed New York City, is secretary and treasurer

May Soon Get Coast Plant

Expansion of the Fokker organization began last fall when the westerners assumed control A plant was added at Wheeling W Va, and plans were announced for a West Coast factory The latter plant will very likely be erected sometime this year

It was said that the deal with General Motors, which involves a score of millions is the culmination of negotiations of several months The Fokker officials hold that the new interest will result in great advantage in making the efficient General Motors nation-wide distribution system available to the Fokker interests

It is pointed out, incidentally, that the deal does not involve Western Air Express for though Harris M Hanshue heads both W A E and Fokker, it is declared that no stock in Fokker is held by W A E, or vice versa

Aero Layout For World's Fair

CHICAGO (ILL)—Aeronautics will assume an important place in the Chicago World's Fair 1933, according to reports with science applied to industry as a main theme of the show. Layout of grounds architecture, illuminations, and decorative schemes are being planned, it is said, with the expectation that a great many will arrive by plane and view the Fair from the air

Graf Flight Off After Failure

TOULON (FRANCE)—Flight of the Graf Zeppelin to the United States has been postponed for the time being according to statements here by Dr. Eckener, after examination of the four engines which failed after the dirigible had reached the vicinity of Cartagena, Spain in her start for America May 16. New engines are to replace those which broke down and forced the commander to turn his craft back only later to have it drift helplessly, and nearly to disaster—to Cuers hangar, near this city where it was finally safely housed Some question has arisen over the failure of the Maybach power plants, but it is generally held that many hours of previous flying and undue speeds at the beginning of this last trip probably caused the trouble.

Embry-Riddle Gets Flamingos

CINCINNATI (OHIO)—Delivery was recently made here of three Wasp-powered Flamingos, made by the Metal Aircraft Corporation, this city, to the Embry-Riddle Aviation Corporation for passenger and mail service on the Cincinnati-Indianapolis Chicago route

Curtiss Marine Races Attract 24 Naval Planes

WASHINGTON (D C)—Twenty-four planes from the naval air stations along the Atlantic seaboard have been entered in five flight classes of the Curtiss Marine Trophy competition, scheduled at Anacostia Naval Station today (May 25).

Entries in the five divisions of the race are as follows Training planes—Lieut Miles R Browning Lieut. James H McKay, and a third entry whose pilot has not been named; Torpedo planes—Lieut G D Townsend Lieut William J Slattery Lieut P D Woods Lieut H L Hoppug and Lieut. W G Cleaves; Amphibion planes—Lieut C McGauly, Lieut B Groh, Lieut Comdr J E Ostrander and a fourth, whose pilot has not been named. Observation planes—Lieut. Comdr Charles G Halpine Lieut W D Sample Lieut. W G Moser, Lieut Dixwell Ketcham, Lieut Alfred C Olnes Lieut. J. L. Kane and Lieut E W Rounds Pursuit planes—Capt. J. T. Moore, U S M C. Capt A H Page Jr, U S M C; Lieut W O Brice U S M C, Lieut Allan Flagg and Lieut. W C Tomlinson

Stockholders Will Plan Mahoney Sale to A.D.C.

ST LOUIS (MO)—Stockholders of the Mahoney-Ryan Aircraft Corporation this city, will meet May 28 to discuss plans of the sale of the concern to the Aircraft Development Corporation, Detroit Mich

Mahoney Ryan is controlled by a group of St Louisans including Phil DeC Ball Harry H Knight and Harold Bixby, two of Colonel Lindbergh's backers The plant was moved here from San Diego, Calif, after the St Louis group gained control B Frank Mahoney, who was president of the firm at the time of the Lindbergh flight sold his interests to Mr Ball last year The company now is operating on a schedule of two planes a week

The Detroit firm owns an airport at Grosse Isle It is now completing an all-metal dirigible for the United States Navy

New Eastman to Seat Four

DETROIT (MICH)—A second sesquiplane flying boat is well underway here at the Eastman Flying Corporation plant This craft will be similar to the initial "Sea Rover" except that control seats will be in tandem rather than of the side-by side arrangement Without widening of the hull the forward cockpit will be fitted to seat two, giving a capacity of four places Instruments will be carried in the front cockpit

Name Officers Of Bendix Aviation

CHICAGO (ILL.)—Directors of the Bendix Aviation Corporation at their first meeting elected the following officers president, Vincent Bendix, vice-president, W L. O'Neill, vice-president, W L. McGrath secretary, H A Gossner; assistant secretaries, H C Hartman, and M Carr; treasurer, W J. Buettner, assistant treasurer, H A Gossner, comptroller, W H. Hougton. The directors are Vincent Bendix, president of the Bendix Aviation Corporation; C. E. Wilson, General Motors Corporation; Richard F Hoyt of Hayden Stone & Company and chairman of the board of the Wright Aeronautical Corporation C O Munger, president of the Electric Auto-Lite Company, Clement M. Keys president Curtiss Aeroplane and Motor Company Inc.; Paul H Davis, of Paul H Davis & Company, Chicago; W. L. O'Neill, president of the Stromberg Carburetor Company, Frederick B. Rentschler, president of the United Aircraft and Transport Corporation, Albert Bradley, General Motors Corporation, James C. Willson of J. C. Willson and Company and president of the National Aviation Corporation; J C. Ferguson, president of the Eclipse Machine Company; W L. McGrath, vice-president of the Eclipse Machine Company; W J. Buettner, vice-president of the Bendix Brake Company, Graham B Grosvenor, president of The Aviation Corporation; and David Beecroft vice-president of the Bendix Corporation

The committees appointed were Executive Committee Vincent Bendix, chairman C E Wilson W L. O Neill, W L McGrath, W. J. Buettner; financial committee; Albert Bradley chairman, W. J. Buettner, Richard F. Hoyt, Paul H Davis, Vincent Bendix and C. O Munger

Baum Offering Flotation Gear

ELMHURST (L. I., N. Y.)—Seymour J Baum Inc., recently organized here at 268 Albion Street, is now offering all-metal all-wood, and composite flotation gear for aircraft, as well as fuel and oil tanks, cowlings, collector rings aluminum, aluminum alloy and monel parts and fittings and aluminum alloy heat treating Mr. Baum, who has had twenty years' manufacturing experience in the automotive field, formerly was manager of the airplane division, Brewster & Company Long Island City

Western Buys Wheeler-Halm

SAN FRANCISCO (CALIF.)—Western Aviation Supply Company this city, has purchased Wheeler-Halm Company, Los Angeles, and plans to establish a series of supply depots handling planes and accessories throughout the Pacific Coast region Main offices have been established at the Oakland Airport, and the Los Angeles store will be continued.

Schenectady Show Scheduled

SCHENECTADY (N. Y.)—Schenectady's Chamber of Commerce, with the assistance of Schenectady Airport, Inc., is arranging an air show for June 27-29 at the Schenectady Airport An exposition and demonstrations of planes and accessories are planned with the General Electric Company, local manufacturer, a leading firm in the display.

Ninth Annual Show At Baltimore Juue 1

BALTIMORE (MD)—The ninth annual aircraft exhibition of the Flying Club of Baltimore together with the air corps of the Maryland National Guard will be held at Logan Field on Saturday June 1 instead of May 30, it has been announced by Maj William D. Tipton, commander of the air corps, M N G The decision to change the date was reached after a conference between Major Tipton Capt Charles Mavson and other officials on the committee of arrangements In the past the event, has been held on Memorial Day

Many visiting military planes from national guard units from other states the Army, Navy, and commercial organizations are to assemble at Logan Field A program of races between national guard pilots, Army and Navy pilots and commercial planes has been arranged according to Captain Masson Among the States which have accepted invitations to participate are Connecticut New York and Pennsylvania Lieut James E. Doolittle, of the Army, Lieut "Al" Williams, of the Navy, and many other noted pilots are to be present.

Test American Eagle Phaeton

KANSAS CITY (KAN.)—The first American Eagle "Phaeton," a three passenger Whirlwind powered biplane produced by American Eagle Aircraft Corporation, was test flown late last week at Fairfax Airport by Larry D. Ruch, chief test pilot for the concern, and Jack E. Foster, engineer and designer Following the first flights, E E Porterfield, president of the American Eagle company, announced that the tests were successful. The plane designed for use with Wright 165 hp radial or engines of greater power, is said to have shown fine stability It employs a center section and staggered wings The interplane and center section struts are of chrome molybdenum steel.

Expanding Western Air Branch

OAKLAND (CALIF.)—Enlargement of the western district of the United States Department of Commerce aeronautic branch and transfer of the headquarters of this district from San Francisco to Oakland has been announced. F F. Mouton district supervisor of aeronautics for the department is now establishing offices at the Oakland Airport and will be assisted by a staff of two persons

Packard Diesel Flown to Virginia

Powers Stinson in Low Cost Flight From Detroit

NEWPORT NEWS (VA.)—Packard Motor Car Company, Detroit, demonstrated its Diesel aircraft engine publicly last week at the fourth annual conference of the National Advisory Committee for Aeronautics. A Stinson-Detroiter cabin monoplane, powered with the Packard nine cylinder, radial Diesel, was flown from Detroit to Langley Field Further demonstrations of the practicability of the engine were made in short flights from the field

The 700 mi. flight from Detroit was made in 6 hr., 50 min., and on this hop the engine consumed $4.68 worth of common furnace oil, according to a telegram filed to the Packard company by Capt. L. M Woolson after the plane had landed Since the oil burned by the Diesel is said to cost $.08 per gallon the fuel consumption of the engine on the trip has been estimated at 54 gal. A radial air-cooled gasoline engine of about 200 hp consumes approximately 12 gal of fuel an hour. Figuring the cost of gasoline at $.30 a gallon a flight similar to the one made by the Diesel powered Stinson would cost $24 The Diesel can be operated on an even cheaper grade of oil than that used in the tests, it is reported

The weight of the Packard Diesel has been estimated at 3 lb per hp. This is heavier than most of the modern gasoline engines used in aircraft, but the lessened fuel required for the Diesel is said to overshadow the increased weight. In fact, the saving in the weight of fuel is supposed to be approximately 40 per cent which would compensate for the increased weight of the engine and would also make possible the carrying of greater pay loads

Order 130 Great Lakes Planes

CLEVELAND (OHIO)—Great Lakes Aircraft Corporation this city, has received new plane orders totalling $730,000 Charles F Van Sickien vice-president in charge of sales announces, with North Atlantic Aviation Inc Boston, which will act as New England distributor, accounting for $610,000 worth The Boston firm contracted for 50 2T-1 Trainers 40 Model 2T-2 sport biplanes, and ten twin-engined amphibions while Vance Flying Service Great Falls, Mont Montana and Wyoming distributor completed the total with an order for 30 Trainers.

International to Jackson, Mich.

DETROIT (MICH.)—The Chamber of Commerce Jackson Mich., is reported to have promoted a company to purchase control of and take over the International Aircraft Corporation Cincinnati moving the International plant to Jackson

P & W to Build Large New Plant

Report Vought Firm May Employ Section

HARTFORD (CONN.)—What will be one of the largest manufacturing plants in the country will be erected in East Hartford, it is announced by Frederick B. Rentschler, president of the United Aircraft & Transport Company and president of the Pratt & Whitney Aircraft Company. Work will start about July 1 on the plant designed for the eventual employment of nearly 5,000 men and which will cost several millions to construct. The 600-acre site near the Connecticut River across from Brainard Field, the Hartford airport, is now being filled in.

Although plans are not yet complete, the new plant, it is said, may be used in part by the Vought corporation of Long Island City, N. Y., makers of the Corsair plane. Both the Vought corporation and the P. & W. company are subsidiaries of United Aircraft and Transport.

The new plant is to be completed by the parent organization, it was learned here. The ambitious project will include, aside from the manufacturing enterprise, the establishment of the eastern terminal of the United Aircraft. The Pratt & Whitney company will be increased to three times its present size, the floor space in that company's unit to contain approximately 500 000 sq ft.

Under the arrangements contemplated the Vought corporation will vacate its Long Island City property, covering about 100 000 sq ft., and move to East Hartford.

In connection with the new eastern terminal airport for United hangars will be built of sufficient size to house the largest of airplanes, it is expected. The field will be the proving ground for airplanes made at the new combined plant. The field will in no way compete with Brainard Field, as it will be entirely private and for the use of United Aircraft and its subsidiaries only.

Property Nearly a Mile Square

"The new plane has been made necessary," Mr. Rentschler said. "Because of the enormous demand for Pratt & Whitney 'Wasp' and 'Hornet' motors, and to the increased business of the Pratt & Whitney Company, manufacturers of tools and machinery, a portion of whose plant the Pratt & Whitney Aircraft Company now leases. The property in East Hartford is nearly a mile square, and has a 2,000-ft. frontage on South Main Street.

"According to present plans, the new plant will be of single story construction containing about 500 000 sq ft. of floor space and will include at least one hangar. About 50 pieces of land were bought to secure the entire amount of land." Albert Kahn, Inc., of Detroit, is the engineering firm which will plan the proposed plant.

Challenger Robins Approved

WASHINGTON (D. C.)—Two new approved type certificates have recently been issued by the Aeronautics Branch. They are: No. 143—Curtiss Robertson C1, three-place closed land monoplane, Challenger, and No. 144—Curtiss-Robertson C2, three-place closed land monoplane, Challenger.

Two School Groups Get Student Insurance

Two announcements have been received that aero schools are obtaining life and disability insurance for their students. Universal Aviation Schools is one organization having been issued a policy by Clark & Gumotte, Kansas City, calling for students $1 000 policies through the training period at a cost of $20 with $45 the charge for a $2,500 risk.

Clark & Gumotte have organized the Central Surety and Insurance Corporation and the Employers' Reinsurance Corporation, of Kansas City, into a pool operating through its firm as sole underwriting managers to carry the risk. Combined assets of the two firms are more than $10 000 000.

Arrangements are also reported completed through Aviation Protection, Inc., New York City, to insure all students of National Flying Schools, Inc., against loss of life, limbs, or sight during the course of instruction. The first of the National school chain planned was recently opened at Buffalo.

The latter insurance said to be $5 000 for each student, was placed by Aviation Protection with Barber and Baldwin, Inc., aero underwriters.

A.S.M.E. Honors Twelve

ST. LOUIS (MO.)—The twelve named to receive the gold wrist watches at the national aeronautical meeting of the American Society of Mechanical Engineers have been announced here. They were selected from a group of 60 recommended for the honors and are as follows: W. E. Boeing, Lieut. James Doolittle, Miss Amelia Earhart, Carl F. Egge, Brig. Gen. William E. Gillmore, Capt. F. C. Hingsburg, Prof. Alexander Klemin, Dr. G. W. Lewis, William P. MacCracken, Igor Sikorsky, Ralph Hazlet Upson, and Lieut. Alford Williams.

Flying Cross to Williams

WASHINGTON (D. C.)—Lieut. Alford J. Williams, U. S. N., has been awarded the Distinguished Flying Cross. The citation was primarily based on study of the action and control of a violently maneuvered airplane in inverted flight made in tests in March, 1928. It was pointed out that in these and many other tests Lieutenant Williams had voluntarily flown at great personal risk in order to evolve principles the practical application of which have made aerial maneuvers safer.

Twenty-Two Craft In Gardner Air Races

ST. LOUIS (MO.)—As we go to press, 22 airplanes are entered in the Gardner Annual Trophy Races May 28-30. Two winners of national races last year are included: John Wood, winner of the Ford Reliability Tour, and Earl Rowland, a New York-Los Angeles trans-continental race victor.

In the elimination contests, eight planes will fly from Buffalo, N. Y., three will fly from Fargo, N. D.; three from San Antonio, Tex.; three from Denver, Colo.; and five from Jacksonville, Fla., according to present entries.

The twenty-two pilots and the planes they will fly are: Tex Lagrone, Waco; W. Parker Runyon, Jr., Travel Air; Arthur J. Davis, Waco; John P. Wood, Waco Taper-wing; Sydnor Hall, Travel Air Speedwing; Neil R. McCray, Waco; D. C. Warren, Travel Air; George E. Halsey, Ken Royce; Stanley T. Stanton, Cessna D. C. 6; Earl Rowland, Cessna Model CM-1; A. B. McMullen, Travel Air; Willard van Beuren King, Travel Air; Ed. Hedeen, Waco Taper-wing; Marvin T. O'Dell, Cessna; Robert S. LeRoy, Cessna Monoplane; Dale Jackson and two yet to be chosen to pilot three Robins; George Haldeman, Bellanca; Gentry Shelton, Travel Air; Lloyd F. Lane, Laird LC-R; Chas. W. Holman, Laird.

Ground Instruction At Akron University

AKRON (OHIO)—Aeronautical instruction at Akron University, in conjunction with a course of flight instruction by Air Services, Inc. at Akron Airport, will begin on June 3, it is announced by George W. Merz, president of Akron Industrial Foundation and Air Services. Approximately 50 are to be enrolled for the ground school instruction, to be under the direction of Dean Fred E. Auer of the engineering school. Complete ground and flying instruction is expected to take approximately three months. Twenty-five lighter-than-air students of the Goodyear Tire & Rubber Company and the Goodyear-Zeppelin Corporation under John Farnsworth, former commander in the Navy, also will be enrolled in the ground school.

Flying Displays at Holmes

JACKSON HEIGHTS (L. I., N. Y.)—Sunday afternoon flying exhibitions have been inaugurated at Holmes Airport here by Gates Flying Service, Inc. Wing walking, upside down flying, parachute drops, and general aerobatics comprise the program.

Chamberlin Heads Crescent

NEW YORK (N. Y.)—Clarence D. Chamberlin, city aeronautical consultant, has been elected president of the Crescent Aircraft Corporation. Donald J. Sargent was named treasurer, and Jack F. Rielly, secretary.

Interstate Goes To Holding Firm

Is Latest Acquisition of Aviation Corporation

NEW YORK (N. Y.)—Latest acquisition of The Aviation Corporation, strong holding and developing company, is Interstate Air Lines, Inc., operator of a Chicago-Atlanta mail and passenger line. Control of both Universal Aviation Corporation and Embry-Riddle Mid-west airline company also formally passed to The Aviation Corporation.

"Acquisition of Interstate Air Lines," said Graham B. Grosvenor, Aviation Corporation president, "not only increases to approximately 5 800 mi. the extent of established air transport services. The Aviation Corporation now controls but it serves as a vital link between the Northern and Southern groups of lines we previously obtained."

The main Interstate line extends 632 mi. from Chicago to Atlanta through Terre Haute, Evansville, Nashville and Chattanooga. A 145-mi. spur from St. Louis joins the trunk line at Evansville. Interstate's fleet of Fairchild and other planes flies 1 536 mi. on daily schedule over these routes.

"A majority interest in the Universal Aviation Corporation has passed to us and the plan under which The Aviation Corporation was to obtain control of the Embry-Riddle Company has become 100 per cent operative," Grosvenor announced furthermore.

Acquisition of the Embry-Riddle Company by The Aviation Corporation was effected through the medium of the Embry-Riddle Aviation Corporation incorporated for that purpose in Delaware on April 15. Formed under a contract between The Aviation Corporation and holders of a majority of the Embry-Riddle Company stock it has an authorized capitalization of 600 000 no-par-value shares. Of these 146 000 are outstanding and 104 000 are in reserve for option warrants.

Bridgeport Absorbs Mooney

WICHITA (KAN.)—The new Mooney plane, a low-winged three-placer, will be manufactured by the Bridgeport Machine Company here. This concern has absorbed the Mooney Aircraft Company and will operate it as a subsidiary. A. W. Mooney, designer of the plane, is president of the aircraft company. He will have complete charge of the factory. J. A. Woods, president of Bridgeport, is chairman of the Mooney board. A. A. Buschaw of Bridgeport is secretary and treasurer of the aircraft company. Louis Height will be chief engineer and Don Robinson will be his assistant.

Hall Firm Assets to Northern

WAUSAU (WIS.)—Assets of the Hall Aircraft Corporation this city, have been purchased by Northern Airways, Inc., it is announced.

Arrange Goebel Flight Refueling

MINNEAPOLIS (MINN.)—Refueling posts over a world trail at all points except Russia have been arranged, according to a recent statement here by Art Goebel, who plans to attempt a non-stop globe flight. Goebel's plane is reported well under way at Kansas City. The single-engined machine to carry 600 gal. of fuel will be ready by June 1, it is said.

"Bird" Scheduled for Tour

BROOKLYN (N. Y.)—A "Bird" plane, made by the Brunner Winkle Aircraft Corporation this city, is starting on a coast to coast demonstration tour, it is announced. The factory reports plane a-day production.

Richfield Announces Big Gasoline Contracts

LOS ANGELES (CALIF.)—Contracts for aviation gasoline, the sales total of which are estimated to reach in the neighborhood of $2 500 000, within the next twelve months, are announced by the Richfield Oil Company of California through C. M. Fuller, president.

Transcontinental Air Transport to start a coast-to-coast air-rail service about the first of July has contracted for Richfield fuel for its western division. Western Air Express has chosen this gasoline for its services. Standard Air Lines, operating an air-rail system between this city and St. Louis, uses Richfield gasoline; and the needs of the Maddux firm are also being supplied.

Mr. Fuller also announces that Richfield is starting distribution of its aviation gasoline on the Atlantic Seaboard and has closed contracts at 40 airports in the East, including Newark Airport, Newark, N. J., and Teterboro, at Hasbrouck Heights, N. J.

Sales Group in Mass Flight

CHICAGO (ILL.)—Twenty-five trimotored planes of Universal Air Lines System were scheduled to take off May 23 from the Chicago Municipal Airport for the Curtiss Field south of Milwaukee, carrying 200 Chicago representatives of the Chicago and Milwaukee Sales Managers' Association as passengers. This airplane trek was arranged for the purpose of transporting the Chicago salesmanagers to Milwaukee for a meeting with the sales managers in that city. Col. Charles A. Lindbergh was to be the principal speaker at a banquet, held at the Pfister Hotel following the meeting.

Ohio Witnesses "Warfare" in Air

New Yorkers Await Raiding Keystone Plane

NEW YORK (N. Y.)—As we go to press, New Yorkers are looking to the skies awaiting the arrival of the Keystone LB-7 bombing plane scheduled to fly from Wright Field, Dayton, Ohio, Tuesday, refuel over Bolling Field, Washington, and arrive here at approximately 8 p.m., Eastern Standard Time, to simulate a bombing raid.

The plane will be piloted by Lieut. Olas Moon, Air Corps, who will have with him as relief pilots and bombers Lieuts. Eugene Eubanks, Paul C. Richter, Charles T. Skow, and Mr. Bradley Jones, navigation expert of the Air Corps Material Division, Dayton.

The flight to New York is a high spot of the air activity in the war maneuvers in Ohio in which the Blue air forces are commanded by Col. H. C. Pratt, commanding officer at Mitchel Field, and the Red by Maj. J. H. Reynolds also of Mitchel Field.

Air "hostilities" with some 200 planes in the "show," began in Ohio on May 16 when the Blue airmen attacked Newark, Ohio, and Brice, Ohio, later to "destroy" the railroad yards at Columbus. The Reds retaliated by attacking Troy, Ohio, while the Blues again successfully raided Newark. The next Red move was an attack on the Fairfield Air Depot. At 9 p.m. on the 16th six Blue bombers took off and flew to raid Winchester. The day favored the Blues.

On the 17th the Blues bombed Hebron, a supply base, the Reds meeting them in the air. Another Blue attack squadron raided bivouac areas in the vicinity of Lockbourne. Late in the afternoon Red bombers inflicted more damage on the Fairfield depot, with honors for the day about even. The morning of the 18th saw the Blues making a raid on the Red supply base at Columbus. In the afternoon the Blue and Red planes met over Cincinnati in combat engagement, and later the combined forces flew in review before Major General Nolan at Norton Field, Columbus.

Kentucky Gas Business Sold

LOUISVILLE (KY.)—Kentucky Oxygen Hydrogen Company, Louisville, which made the fuel gas for the return journey of the Graf Zeppelin, has sold its oxygen, hydrogen and acetylene business to the Air Reduction Sales Company of New York. The Louisville company will be known as the Louisville district.

Ta-Ho-Ma Adopts Bloxhams

ELGIN (ILL.)—Bloxham Safety Sticks will be standard equipment on the Ta-Ho-Ma Airplane Corporation's training planes, according to a recent announcement.

Aero Supply Firm Merger Completed

Standard, National Join With New York Company

NEW YORK (N. Y.)—Reports of the eventual consolidation of Aero Supply Manufacturing Company, Inc, New York, Standard Automatic Products Corporation, Corry, Pa, and National Steel Products Company Dayton, Ohio, are now confirmed with the announcement of completion of the merger under the name Aero Supply Manufacturing Company, Inc George I. Stich, long head of the latter company, is president of the new organization and also of each of the three merged companies

The officer personnel is now as follows Aero Supply, president, George I Stich, vice-president, E W Stepheson secretary, Guy Pomp, treasurer, E H Kollmeir Directors George I Stich, Guy Pomp, E H Kollmeier and E W Stepheson, Roy C Cool Harry A Redmond, A S Creighton Arthur S Russell National Steel Products president, George I. Stich, vice president, T M Hiester, secretary and treasurer, E H Kollmeier Directors George I Stich, T M. Hiester, Chas H Scott H M Hiester, E H Kollmeier James H Heitzmann Standard Automatic Products president, George I Stich vice-president, L. T McElroy, secretary and treasurer, E H Kollmeier Directors George I Stich L T McElroy, E H Kollmeier, James H Heitzmann, Frank N Ames

The physical operation of the plants will continue as before, and each will preserve its identity Headquarters will be at the Aero Supply offices at College Point, L. I., N. Y

To Add New Products

The Dayton plant now employs about 100 persons but the intention is to double this number within six months The plant is now devoted to making of fuel pumps, engine controls and gas and water line fittings New products are soon to be added.

The Aero Supply Company manufactures airplane accessories and parts for the Government and for commercial manufacturers Employment at its College Point plant has increased from 50 to 100 workers in the past four years The present plant occupies 40,000 sq.ft of floor space

The merging companies have specialized in materials as new process hexhead bolts forked-end and rigid terminals, special screws, eye bolts dural bolts, fittings, clevis pins, swaged rods streamline wires, washers, turnbuckles, struts shackles, and all machine screw products, as well as cotton fabrics and aero specification steels and tubing

Unfilled orders of the three plants now total close to $500,000 according to President Stich The Dayton plant is working overtime, three shifts are employed in the Corry plant, and two in the New York factory

Albany Chosen for Air Branch

ALBANY (N Y)—Selection of Albany for the headquarters of the northern New York district of the United States Bureau of Aeronautics has been announced by Department of Commerce officials Howard Jones, chief inspector for the district who succeeded Hugh Brewster, has been placed in charge Establishment of an office at the Albany Airport is being projected.

New Firms Announced

SOLAR AIRCRAFT COMPANY San Diego Calif B B Starke president Edmund T Price, vice president and general manager, Ellis DeWolfe vice president, and B H Taylor secretary Wm L Lewis, chief engineer, and Fred H Rohr, plant superintendent to take over the aircraft manufacturing business formerly conducted by the Prudden Aircraft Corporation

AIR EXPRESS INC, Columbus, Ohio; capital $150 000 by Allen Pretzmann, H J McCoy and S S Craig

NEW YORK SEAPLANE AIRPORT, Inc., 52 Wall St, New York City by Kenneth E Walser, Ellen M Bywater and Marie E. Casey.

BUCHANAN AIRPLANE CORPORATION, 32 Broadway, New York City capital $1 000 000 George Cowell secretary; to deal in aircraft of all kinds,

TRAVEL AIRWAYS Colorado Springs, Colo, by R. E. Edgar, to carry on sightseeing and cross country flying service using airports at Denver, Pueblo and Colorado Springs

AVIATION INVESTORS, INC., 393 Seventh Ave New York City, capital $20 000 by David L Shillingham, A H Kopprasch Frank E Masterman and J J Richmond, to invest in aviation securities

ORANGE COUNTY AIRWAYS INC, Middletown, N Y, capital $25 000 by Roy D Monroe, Stephen C Hallock and William H Hallock to provide aircraft servicing

HAYES AVIATION, INC Onondaga Hotel Syracuse N Y capital $1 000, by Robert C Hayes Albon R Hayes and Andrew W Ryan, to engage in air transportation

LONE STAR AIRCRAFT CORPORATION, Dallas, Tex capital $100 000, James E. Branch, president and Willard Mohlar general manager, to manufacture a five-place commercial plane and operate a flying school

AERIAL MAPPING ENGINEERS INC Portland, Ore., by Frank O Mercer Bev Clark, Bill B Shields and Gordon Mounce to do aerial mapping in Oregon, Idaho and British Columbia.

Report N-B Business Increase

MARSHALL (MO)—The Nicholas-Beazley Airplane Company this city is reported to have had a parts and supply business increase of more than 20 per cent over the first four months of 1928 in the first quarter this year

Henderson Announces Cleveland Exhibitors List

CLEVELAND (OHIO) — Exhibition space for the show here in connection with the National Air Races is reaching the premium stage, according to Clifford Henderson, managing director More than 80 plane and accessory firms applied for space before May 15, he stated Included among the concerns taking space in advance of May 15 are the following

Acme Aircraft Corporation, Aero Corporation of America, Aeromarine Klemm Corporation, American Eagle Aircraft Corporation, Aircraft Safety Devices Inc *Aero Digest* Alliance Aircraft Corporation *Air Transportation* The Austin Company, AVIATION, Brunner Winkle Aircraft Corporation Balsa Wood Company, Boeing Airplane Company Bellanca Aircraft Corporation, Berry Brothers Champion Forging & Machine Company Crescent Tool Company Cleveland Pneumatic Tool Company Curtiss Flying Service, Cleveland Tool & Supply Company

DeWalt Products Corporation, Eclipse Machine Company Ex-Cell O Tool & Mfg Company, Eastman Aircraft Corporation, Endicott Drop Forge Company E. S. Twining & Company Fyr-Fyter Company, Gates Aircraft Corporation Green Patents Syndicate, Guardian Aircraft Corporation Great Lakes Aircraft Corporation, George D Waner & Company, Heskelite Mfg Corporation, Hawthorne Model Aero Company Heath Airplane Company Hamilton Propeller Company, Hamilton Metalplane Company Heywood Starter Corporation International Nickel Company

International Flare-Signal Company Johnson Airplane & Supply Johnson Company Kendall Refining Company, Kinner Airplane & Motor Corporation, Kreider Reisner Aircraft Company Lambert Aircraft Engine Corporation, Leece-Neville Company Floyd J Logan Aviation Company Moundsville Airplane Corporation Moth Aircraft Corporation, Moreland Aircraft Corporation MerWhyte Company, National Air Pilots Assn. Naturaline Company of America Nicholas Beazley Airplane Company Paragon Engineers Inc. Packard Electric Company Parker Appliance Company Pratt & Whitney Aircraft Corporation Robbin Flying Service

Showalter Associates, Inc., Swift Airplane Corporation, Scintilla Magneto Company Simmons Boardman Pub Company, Strauss & Buegeleisen Szekely Aircraft Corporation Ta-Ho-Ma Airplane Corporation Thompson Products Company, Texas Company Travel Air Mfg Company Verville Aircraft Company Warner Aircraft Corporation George D Wanner Company Wright Aeronautical Corporation Westinghouse Electric and Manufacturing Company Wyman Gordon Company and *Western Flying*

Firm Takes Sullivan's Name

WICHITA (KAN)—"Sullivan Aircraft Company" is the name which has been taken by the new Wichita group which is to manufacture a three-place low-wing monoplane announced in AVIATION for May 11 William P. Sullivan is chief engineer and general manager Edgar L. Bales is financially interested in the firm

Consolidateds for Cessnas

WICHITA (KAN)—Contract for 200 sets of instruments has been awarded by the Cessna Aircraft Corporation to the Consolidated Instrument Company, New York City

Five Waco Sports to China

TROY (OHIO)—Five Waco 220 Taperwing planes were recently shipped to the Aviation Bureau Canton China by the Advance Aircraft Company, this city

N. A. T. Adds More Boeings and Falcons

CHICAGO (ILL.) — National Air Transport has purchased ten new mail and express cargo planes to be added to its fleet for operation between Chicago and New York and Chicago and Dallas Six Boeing 95 cargo planes have been delivered to the N A T operations department here by the Boeing Airplane Company and will be placed in service between Chicago and New York These planes are powered with Pratt & Whitney Hornet engines and have a cargo capacity of 1,550 lb with a cruising speed of 110 m p h

Four Curtiss Falcon cargo planes powered with 400 hp Liberty engines have been ordered and will be delivered within the next thirty days These planes will be added to the fleet of seven Falcons now in service between Chicago and Dallas They carry 750 lb of cargo and cruise at 115 m p h This brings the total number of planes in the N A T fleet of 50

The performance of the Falcons now in operation, according to N A T officials has been very satisfactory The high cruising speed of these planes N A T's manager of operations asserts, has effected a reduction of 45 min in the average flying time between Chicago and Dallas The mail Falcon is an adaptation to commercial use of the well-known military Falcon

Air Show Will Be Held At Macon May 31-June 2

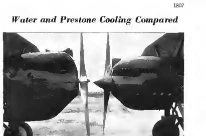
MACON (GA)—Arrangements have been practically completed for the first Southeastern Aeronautical Exposition to be held at the municipal airport here May 31-June 2 under the auspices of the Macon Junior Chamber of Commerce.

Invitations have been extended by those in charge to leading manufacturers of airplanes and accessories, and many of these having now accepted the invitation the success of the exposition seems assured While these displays will be the feature of the exposition arrangements have also been made with several well-known pilots for stunt flying, races, etc, and similar events typical of air meets It is also stated that the exposition will mark the dedication of Miller Field at Macon for night flying

Meet Follows Kansas Tour

WICHITA (KAN)—An air meet will be staged at Wichita on June 15 to mark the close of the annual All-Kansas Air Tour, which leaves this city for a tour of more than a score of Kansas cities on June 3 Men in charge of the program have agreed to offer $2 000 in prizes to winners in the various race and stunt events To be eligible for the cash prizes the planes and pilots must have remained with the tour from start to finish

Water and Prestone Cooling Compared



GARDEN CITY (L I N Y)—Within a few weeks of the announcement by the Army Air Corps that its engineers, after a long series of tests at Wright Field Dayton Ohio, had proven Ethylene Glycol, known by the trade name of Prestone, to be a cooling fluid superior to water, the Curtiss Aeroplane & Motor Company installed a Prestone Cooling System on a Curtiss Mail Falcon powered with a Curtiss Conqueror

The most striking result of the installation was the reduction of the radiator to approximately one-quarter of its former size, due to the fact that only 4½ gal of Prestone are required to cool the engine whereas 18 gal of water have formerly been necessary In consequence, the frontal area was greatly diminished and the general aerodynamic efficiency of the airplane much improved The saving in weight amounted to approximately 125 lb and in addition, since Prestone does not boil until 387 deg F., it allowed the engine to operate at higher temperatures and consequently with greater efficiency

Shortly after the installation was completed a public demonstration of the superiority of the new cooling fluid was held at Mitchel Field before a large group of newspaper men and officers of the Curtiss company As a part of a comparative demonstration, a Prestone-cooled Falcon was flown side-by-side with a water cooled Falcon of equal power, and clearly demonstrated superiority in speed and performance.

Tour Promotes Country Clubs

LOS ANGELES (CALIF.)—Miss Ruth Nichols aviatrix, Robb C, Oertel business representative of Aviation Country Clubs, Inc., C C. Bedford, service manager for the Curtiss airplane company, and Charles Taylor Little Rock Ark, are making a tour of Pacific Coast cities for the purpose of arousing interest in the establishment of Aviation Country Clubs. Miss Nichols is flying alone in a Curtiss Fledgling Oertel and Bedford occupy a Curtiss Robin and Taylor pilots a Command-Aire The party plans to return to New York by way of Portland Seattle and northern points

Women to Race From Coast

SANTA MONICA (CALIF.)—An airplane race for women involving prizes of $10 000 was announced here at a meeting of the Los Angeles chapter N A A, to be run from this city to Cleveland at the time of the National Air Races The distance is 2,044 mi

Expanding Barrett Firm Gets Challengers

ARMONK (N Y)—Westchester Airport Corporation, formerly known as Barrett Airways, as a part of its big expansion program has purchased from the Fairchild Aviation Corporation four Kreider - Reisner Challenger planes These will be three-place machines equipped with Whirlwinds and will be used for the training of pilots instruction being concentrated largely on Fairchild and Challenger planes

Recently the Westchester Airport Corporation moved into the Chanin Building, New York and also purchased additional property at Armonk, N Y Plans are now under way for the building of four new hangars

Rotarian Fleet to Dallas

WICHITA (KAN)—A squadron of twenty planes will fly from here to Dallas Tex bearing some 75 Wichita Rotarians to the International Convention of Rotary being held May 27-31

PERSONNEL

RICHARD C GAZLEY, assistant chief engineer, and STANLEY S LASHA staff engineer, of the Bureau of Aeronautics, have resigned to enter practice as consulting aeronautical engineers

DONALD M EWING has been appointed director of publicity for the Universal Aviation Corporation, succeeding Mason Peters, resigned

W G WELLS has been appointed assistant to Paul S Gillespie, director of the Robertson division, Universal Aviation Schools

DAVID R. MCCAULEY has been made manager of the Universal Aviation School at Cleveland

H W BOOTH has been appointed manager of the eastern division of Colonial Flying Service with headquarters at the Van Curler Hotel, Schenectady, N Y

E E. DRYER has been added to the staff of pilots of Colonial Western Airways

E LOGAN HILL has been elected director and vice-president of Atlantic Coast Airways Corporation, 551 Fifth Ave, New York City

O L HOBSON has been appointed district sales manager of the Curtiss Flying Service, Moline, Ill

CHARLES T M ECHOLS formerly assistant traffic manager for California of the West Coast Air Transport has been made special representative in charge of public relations

CAPT HAROLD H AMBLER, connected with the construction of the American air depot at Orly France, during the war has been named first vice president, and MORROW KRUM has been made vice-president, respectively of Leonard Macomber, Inc, airport engineers and builders, 664 North Michigan Ave, Chicago

LIEUT WILLIAM L BOYD, Colorado National Guard instructor, is to answer questions on aviation problems submitted to the Denver *Post*

C D BOWYER, former air mail pilot, has been appointed chief of operations in Westfield, N J, airport operated by Atlantic Air Service of Newark

VERN BOOKWALTER, formerly of Pacific Air Transport, has been appointed pilot of the United Union Airlines

J W CRAIG has been elected president of the Braley School of Flying, Wichita, Kan.

H P WHITTLE has been appointed superintendent of the ground school work of the Weeks Aircraft Corporation

ART FOULKES Terre Haute Ind has joined the sales organization of the American Eagle Aircraft Corporation, Kansas City

JAMES GORDON BENNETT has been appointed maintenance radio engineer for the Department of Commerce radio stations on the Pacific Coast Mr Bennett will make his headquarters at the Oakland Calif, airways radio station on Bay Farm Island.

BART STEPHENS former assistant superintendent of Mills Field has been appointed acting superintendent by the city board of supervisors

W J SHELTON formerly chief mechanic with the Von Hoffman Aircraft Corporation of St Louis has been named chief mechanic for the Oklahoma City Universal School of Flying

WILLIAM BLISS, former operations manager for Universal in Chicago has taken over similar duties with the organization in Oklahoma City

ALBERT J MILLER former chief mechanic at Newark Airport, has resigned to work on the Burnelli plane

EDWARD J GREER formerly of the Greer Aeronautical School, Oakland, has been appointed a Boeing System pilot.

M O GRIFFITH, formerly a test engineer at McCook and Wright fields has become chief power plant engineer of the new company organized in Cincinnati by Powel Crosley Jr, which plans to build both airplanes and airplane engines

E B ANDING has joined the engineering staff of the Berliner-Joyce Aircraft Corporation Baltimore, Md

CAPT H GORDON SMITH has been appointed director of public relations of the Consolidated Instrument Company of America, Inc

WILLIAM H CRAMER of Clarion Pa, CAPT WARREN B SMITH and LIEUT HOMER FACKLER have been appointed operations manager and instructors, respectively of the New Standard Flying Service, Inc., Teterboro Airport, N J

O W YOUNG, inspector for the Aeronautics Branch has been transferred to Milwaukee from New York

CYRIL F DIETER has been elected president of the Atlanta Ga, chapter of the N A A, T E MOODIE vice-president N BAXTER MADDOX, treasurer, and R L FLEET, secretary

W A HALLGREN has joined the Robertson division of the Universal Aviation Corporation as pilot.

G M GRAHAM, assistant sales manager of the local branch of Universal Aviation Schools has been promoted to sales manager of the school at Oklahoma City

RAY KUTTERER of St Louis has been named manager and chief flying instructor of the Braniff Flying School at Oklahoma City

STANLEY CADY, of Grand Fork, N D, has been appointed to the staff of Universal Air Lines

H E BARBER formerly with Universal Aviation Corporation, has been elected president of Continental Air Lines

H. G TANK is director of the flying schools operated by the Weeks Aircraft Corporation at Milwaukee, Wis

Representatives Named

STINSON—A W Killip, Chicago Aero Sales, for Indiana and the northern half of Illinois, Portland Airways, Inc, Portland Ore, for Oregon and city of Vancouver, Washington Barnard Air Lines, Youngstown, Ohio and Frank Airport, Inc, Cincinnati, Ohio.

PYLE NATIONAL COMPANY—Western American Aero Corporation, Oakland, Calif

ARROW—United Union Airlines, Spokane, Wash, for Spokane and Whitman counties.

GREAT LAKES—North Atlantic Aviation, Inc, Boston, for New England

BLOXHAM AERO SUPPLY — Aeroplanes, Inc, First National Bank Building, Chicago, Aviation Service & Transport, 203 N. Wabash Ave., Chicago

CARDINAL—Von Hoffmann Aircraft Company, Lambert-St Louis Field, St Louis, Mo

CURTISS-ROBIN—M J Cosentino Seneca Falls, N Y

EAGLEROCK—Rapid Airlines, Inc Rapid City, S D, for Nebraska in addition to South and North Dakota, its present territory, Dakota Airlines, Inc, Sioux Falls, S D, for state of Iowa

DAVIS—Robert Dake and Theodore Taney, for Western Pennsylvania, Eastern Ohio and Northwest West Virginia. The Dayton Air Institute, Inc, Dayton Ohio, for central Ohio

AERONAUTICAL CALENDAR

May 25	Curtiss Marine Trophy Race, Potomac River, Anacostia, D C, under auspices of the Aero Club of Washington N A A
May 25-June 1	First Annual St. Louis Aircraft Show New Coliseum, St. Louis, auspices Jackson Johnson Post No 72 American Legion, Headquarters Hotel Chase
May 27 30	American Society of Mechanical Engineers, National Aeronautic Meeting Hotel Jefferson St Louis
May 27-June 2	Indianapolis Aviation Show of the Indianapolis Aircraft Association, State Fair Grounds
May 28-30	Gardner Annual Trophy Race, St. Louis Mo
May 31 June 1, 2	Southeastern Aeronautical Exposition Macon, Ga.
June 3-15	All Kansas Air Tour, starting and finishing at Wichita.
June 10-14	First Michigan Air Tour Starting at Pontiac Municipal Airport
June 27 29	Air Show Schenectady N Y Airport
June 27 30	International Light Plane Meet, Amsterdam Holland
July 16-27	International Aircraft Exhibition of the Society of British Aircraft Constructors Olympia London
Aug 24-Sept. 2	National Air Races and Aeronautical Show, Cleveland, Ohio
Aug 26 28	Society of Automotive Engineers, Cleveland Aeronautic Meeting
Sept 6-7	Schneider Cup Race, over the Solent, Cowes England
Sept 28	Gordon Bennett Balloon Trophy Race St. Louis Mo
Oct. 12 27	Southwestern Aircraft Exposition, State Fair Grounds Dallas Tex.
Dec 1-9	International Aeronautical Exposition of the Aeronautical Chamber of Commerce, Chicago

BRIEFLY

Manufacture of a French amphibion is to be started at New Haven Conn by the Viking Sea Boat Corporation of which Lieut Reginald D Thomas a winner of the Schiff Trophy, is one of the officials

Pan American-Grace Airways opened its service between Cristobal and Mollendo Peru May 17

Porterfield Aviation Interests, Inc has been organized at Kansas City as a holding company for several aircraft and accessories companies in connection with the American Eagle concern

Construction at Philadelphia Navy Yard of a racing seaplane apparently for entry in the forthcoming Schneider trophy contest, has been reported on reliable authority

Living accommodations are available at Lambert-St Louis Field with the completion of another barrack

Airplane facilities are being included in the plans for a $6 000 000 Miami Beach winter colony development

The 23rd annual convention of the Illuminating Engineering Society will be held at Philadelphia May 24 27

Pan American has leased a hangar at France Field Canal Zone

A bill has been signed in Michigan requiring all pilots in that state to have a Federal license

Considerable interest is being displayed in the Southeastern Aeronautical Exposition at Macon Ga May 31 June 1 and 2

Settlement out of court, for $5 000 and $10 000 in each case has been reported in the $200 000 damage suit against Flyers Inc of Albany N Y for injuries suffered by two passengers in a forced landing last summer

There will be no public issue of Boeing Aircraft of Canada Ltd stock it has been announced.

Airline mileage tickets books are planned by S A F E

When Braniff Airlines moved from its field quarters to a downtown Oklahoma City office the furniture was hauled on a Fairchild and taxied through the streets

Great Lakes Aircraft is reported to have bought the Wills St Claire plant at Marysville Mich. for the manufacture of aircraft

The proposed Kreutzer plant at Culver City Calif will produce a plane a day it has been announced

The Capitol City Flying Club has been organized at Atlanta Ga with Charles H Ford Jr as president

One hundred and seventy passengers were carried on the short Oklahoma City-Tulsa line of the Braniff Airlines during the week of May 4th This is 73 per cent capacity on all ships

Frank H Robertson formerly president of the Robertson Aviation Corp, and his brother, Dan have gone to Mexico in a Curtiss Robin to investigate the possibilities for a flying school in that country

Bertel Chambers and associates of Hornell N Y are reported planning a new concern to manufacture aircraft

An order for 300 altimeters has been reported received from the Navy Department by the Consolidated Instrument Company

Three planes are under construction at the new Portland Ore, plant of the Breese Aircraft Corporation

Elmer Kane Universal pilot recently flew a Lockheed from Chicago to New York in 4 hr 15 min

The Aeronautical Chamber of Commerce and the National Broadcasting Company is making plans for a three-month nation-wide aviation radio program

L Imblum of the Imblum Aeronautical Company of Pueblo, Colo, has been in Wichita, seeking to interest capital in the manufacture of an experimental aircraft engine

Maj Jester D Gardner member of the council of the Aeronautical Chamber of Commerce has gone abroad to investigate new foreign developments

Parking of scarlet colored planes at Charleston, Ill, field proved disastrous when a bull attacked the machines and destroyed them

As we go to press, the Bernard monoplane of Rene LeFevre Armeno Lotti and Jean Assolant, French airmen is poised for an attempted flight from Roosevelt Field to Paris.

As we go to press Captain Eaker is leading in the Oklahoma State Air Tour

Directors of the Coffman Monoplanes Inc of Oklahoma City have decided to standardize on the OX-5 motor for its new cabin monoplane and have installed several thousand dollars' worth of equipment in the factory for that purpose.

Representation for the Southwest on the National Advisory Committee for Aeronautics is being sought by the Oklahoma State Chamber of Commerce

More than 275 Oklahoma cities were to be marked for air travel by May 20 following extensive plans of the Oklahoma State Chamber of Commerce in promoting air marking in cities of the state

Automobiles are to be used by the Southwest Air Fast Express company to transport passengers of their lines in the Southwest to city hotels

The Southwest Air Fast Express, Inc has completed 70 000 mi of service in the first 35 days of its operations

The T A T hangar and field at Waynoka Okla is to be completed by June 1st Two passenger stations one at the field and one near the Santa Fe depot are being built

Design and construction of a factory addition permitting straight line production has been awarded by Great Lakes Aircraft to the Austin Company

TRADE TIPS

It has been reported that

D J Foss, vice president and general manager of the Wooster Brush Company, Wooster Ohio, is in the market for a plane priced in the neighborhood of $5 000

Major C C Mosley western representative of the Curtiss Flying Service located at 1240 Pacific Mutual Bldg Los Angeles, Cal announces that architects have been commissioned to prepare plans for buildings for a flying school to be located at Mines Field near Inglewood Cal The group will include hangar, class room and barracks

Southern Air Lines Inc has purchased the Hugh Garth farm west of Charlottesville Va as the site for an airport and will build several hangars and a clubhouse there

A large hangar will be erected at the Watertown N Y Municipal Airport by the F H Taylor Flying Service Inc The city is to place a 1,500-ft. wire guard fence about part of the flying field proper at a cost of about $1 500

Klamath Falls Ore, has authorized a $50 000 bond issue to provide for purchase of airport land and construction of buildings

Abilene, Tex. has voted $100 000 for the development of an airport site and buildings

Richfield Oil Company will build a $25 000 servicing base at Kansas City

Readvertisement for bids on gasoline oil and refreshment concessions at the Poughkeepsie N Y airport has been ordered

Organization of the Los Angeles Glider Club was announced at the recent meeting of the Southern California chapter of the N A A which was attended by more than 400 persons

Raffaele Maullari Bronx N Y, ice dealer was scheduled to start his air trip around the world this week

During the week ending May 11, 75 airplane licenses nine experimental licenses and fifteen identification numbers were reported cancelled by the Aeronautics Branch Forty-nine planes were re-licensed

Reports are persistent in Portland Ore that Vance Breese is contemplating a flight from Honolulu to the Pacific Coast

An official trip over the T.A.T line is being made by prominent officials and members of their families

Considerable agitation is being made to have the naval air station at Rockaway Point L I removed to Philadelphia

The first plane equipped for a radio receiving and transmitting set at St Louis Field is a Universal Aviation Corporation machine

Kenneth Wright of Ellwood City Pa has established a flying service at Spline Memorial Field.

AIRPORTS AND AIRLINES

W.A.E. Starts First Half of New Line

LOS ANGELES (CALIF.)—This city and Albuquerque, N. M., were joined by air on a six-hour daily schedule with the opening on May 15 of the first half of the Western Air Express route from Los Angeles to Kansas City. Planes used are the Fokker F-10's carrying two pilots and twelve passengers. East and West train connections are made by the planes at Albuquerque, the eastbound plane leaving Los Angeles at 6 a.m., and arriving at Albuquerque before 12:00 noon, when the west-bound train leaves Albuquerque at 12:30 p.m. and arrives at Vail Field, Los Angeles at 6 p.m. The service is to be extended through to Kansas City soon. The present route being 675 mi. in length.

George Rice flew the first plane eastbound and Peyton Rice piloted the first plane into Los Angeles from Albuquerque. Officials said that radio installations have been made at Kingman, Holbrook and Albuquerque, N. M., in order to keep operators informed of weather conditions while en route. This new passenger line gives Los Angeles eleven major air lines, planes departing and arriving daily over routes between Los Angeles and San Francisco, Oakland, Bakersfield, Reno, Salt Lake City, Albuquerque, El Paso, Tia Juana, San Diego, Avalon and Catalina Island.

Northwest Cuts Schedule

MINNEAPOLIS (MINN.)—Changes in the schedule of air mail planes of Northwest Airways, Inc., operating between here and Chicago, have been announced. Eastbound schedule is now as follows: leave Minneapolis 2:45 p.m.; St. Paul, 3:05 p.m.; La Crosse, 4:25 p.m.; Madison, 5:40 p.m., Milwaukee, 6:35 p.m., and arrive Chicago 7:25 p.m. This is 20 minutes faster than the former schedule. Westbound schedule: leave Chicago 6:10 a.m.; Milwaukee, 7:10 a.m.; Madison, 8:05 a.m., La Crosse, 9:20 a.m.; St. Paul, 10:40 a.m., arrive Minneapolis 10:50 a.m. This cuts 1 hr., 10 min. from the former schedule.

Drainage Work to Macomber

CHICAGO (ILL.)—Drainage contract for Air Activities Airport, three miles east of St. Charles, Ill., has been awarded Leonard Macomber, Inc., Chicago airport engineers, with offices at 664 N. Michigan Avenue. Construction the firm announced furthermore has been started on a steel hangar 100 ft. square at Pal-Waukee Airport, Palatine and Milwaukee Roads.

N.A.T. Issues Time Table

CHICAGO (ILL.)—A comprehensive air mail and express information folder and time table has been issued by National Air Transport, Inc., for general distribution. The folder contains the schedules of all air mail and express lines operating in the United States. A map showing all air mail and express lines, keyed in such a manner as to make the use of it with the schedules an easy matter is an important part of the folder.

Nevada Firm Opens Los Angeles-Reno Line

RENO (NEV.)—Tri-weekly service between this city and Los Angeles was inaugurated May 14 by the Nevada Air Lines Inc., when the first plane took off from Boeing Field at 9 a.m. The first Reno-bound plane left Los Angeles on Monday, May 13. Under the schedule adopted, planes will leave Reno at 9 a.m. every Tuesday, Thursday and Saturday, and will leave Los Angeles every Monday, Wednesday and Friday at 9 a.m., according to announcement of G. Ray Boggs, president. No stops will be made pending completion of the new air field at Bishop, in the Owens River Valley, Mr. Boggs said.

Four wasp Lockheeds form the nucleus of the fleet of the company whose officials, in addition to Mr. Boggs, president, are B. F. Mansfield, vice-president, and Ben S. Hunter, secretary-treasurer.

Illinois Air Bill Killed

SPRINGFIELD (ILL.)—A sub-committee of the lower house of the Illinois Legislature reported adversely upon the aviation bill which had been sponsored by the Illinois Airport Conference and the bill has been killed. The Senate had adopted the measure in its original form, giving municipalities authority to impose small tax for airport purposes, but in the House a referendum clause was attached and when the bill went to committee it was disapproved. The Airport Conference, however, will continue its organization and cities are being urged to take such steps as they can under their charters to provide accommodations and facilities for planes.

Mamer Line to Reach Butte

SPOKANE (WASH.)—Daily flying service between Spokane and Butte, Mont., is expected to be started this summer, according to the announcement of Nick Mamer, of the Mamer Flying Service.

Thompson Starts Service Across Lake

DETROIT (MICH.) — With Miss Amelia Earhart in the Cleveland-Detroit plane, and Capt. Frank Courtney, British airman, flying in the Detroit-Cleveland plane, the Thompson Aeronautical Corporation inaugurated its Detroit-Cleveland amphibion passenger and mail service May 14.

The amphibion service is said to be the first amphibion passenger service between two inland cities within the United States. Six passenger Keystone-Loening amphibions are being used in the service. Although, under the passenger service schedule, planes leave Detroit and Cleveland simultaneously at 8:30 a.m., 12:30 noon, 3 p.m., and 5 p.m., mail is carried only on the noon trip.

Pitcairn Passenger Line Soon

PHILADELPHIA (PA.) — Following the purchase of Candler Field at Atlanta, Ga., by the city of Atlanta, and the promise of immediate improvements which would make worth while the construction of a large hangar there by the Pitcairn Aviation Company, the latter concern expects that the way will be clear to start within the next few months its proposed passenger service between Atlanta, Spartanburg and Greensboro, N. C. This would be the first link in a passenger service which ultimately will connect New York and Miami. The city of Atlanta will make improvements permitting safe operation of tri-engined transports at the airport and Pitcairn's investment will be more than $60,000.

Reduce Oakland Hangar Rates

OAKLAND (CALIF.)—Reduction of charges for airplane storage at the Oakland airport was recently announced by the Oakland port commission. Planes taking under 700 sq. ft. of storage space will now pay $35 monthly, the old charge being $40. Commercial charge for one-passenger planes was fixed at $37.50 in summer and $22.50 in winter. The daily commercial storage charge was fixed at $20 in summer and $10 in winter.

Stout Plans Sunday Trips

DETROIT (MICH.)—Stout Air Services, Inc., plan to stage a 25-mile sightseeing flight service from Detroit Municipal Airport each Sunday during the summer months, it was announced recently. Flying operations are not permitted on Sunday at Ford Airport.

T.A.T. Arranges Plane Diner Service

ST. LOUIS (MO.)—Planes of Transcontinental Air Transport, Inc., will be made into aerial diners at luncheon time on the two days of the 48-hour coast-to-coast air-rail journey when operations begin early this summer. Luncheon prepared by the Fred Harvey Company will be served aloft by the plane's courier between St. Louis and Kansas City and between Albuquerque, N. M., and Winslow, Ariz. In mid-afternoon, a light refreshment—tea, bouillon, or ice cream—will be served.

The luncheon will be put aboard the planes in thermos containers and will be served on portable tables at each seat. Careful studies are being made by the Harvey concern to determine the most desirable diet for air passengers. Other meals for T.A.T. passengers will be served in the dining-cars of the Pennsylvania Railroad and in the Harvey restaurants along the Santa Fe Railroad.

Pickwick Airways Starts Second Service

SAN FRANCISCO (CALIF.)—Passenger service was inaugurated between San Francisco and Los Angeles by the Pickwick Airways, Inc., subsidiary of the Pickwick Stages System, when the Glenn Curtiss' took off from Mills Field, the San Francisco terminal, Sunday, May 12. Planes leave San Francisco at 3:30 p.m. daily, except Sunday, arriving in Los Angeles at the Grand Central Air Terminal at 6:45 p.m., and leave Los Angeles at 8:30 a.m. daily, except Sunday, arriving in San Francisco at 11:45 a.m.

Bach 10-place tri-engined transport planes are used on all Pickwick Air Lines, with a Pratt & Whitney 525-hp. Hornet engine in the nose and a 150-hp. Comet engine under each wing. This is the second step in the service of the Pickwick Airways, Inc., the first being the recently inaugurated service between Los Angeles and San Diego.

Varney to Disregard Mail

PORTLAND (ORE.)—Regardless of the air mail arrangements for the last link of the Portland-Salt Lake City route, Varney Air Lines, Inc., will come into Portland this summer with a passenger service between the two cities, L. D. Cuddeback, vice president and manager in charge of the Varney lines, has announced. A hangar 150 ft. square at Swan Island will be built to accommodate the planes.

Vote Mast for Mines Field

LOS ANGELES (CALIF.)—An appropriation of $2,500 was recently voted by the Los Angeles City Council to provide a dirigible mooring mast at Mines Field, the present municipal airport.

Embry-Riddle to Extend Service

INDIANAPOLIS (IND.)—Plans are under way by officials of the Embry-Riddle Company of Cincinnati to establish two round trips daily on the Cincinnati-Indianapolis-Chicago mail route. A third round trip for passengers only is being considered. Completion of lighting equipment has made possible the extension of the schedule to include night flying.

Dirigible Base Plans Protested

PORTLAND (ORE.) — A joint protest against the announcement of the Navy Department that only Los Angeles and San Diego sites would be considered for the proposed new Pacific Coast dirigible base, is sought by W. D. B. Dodson, general manager of the Portland Chamber of Commerce, it is reported. Mr. Dodson has telegraphed chambers of commerce in Seattle, Tacoma and San Francisco asking them to join in the protest. The Oregon Congressional delegation has also been asked to call the matter to the attention of the Secretary of the Navy.

W.A.E. to Stop at Wichita

WICHITA (KAN.)—Wichita has been selected as one of the control points on the Los Angeles to Kansas City daylight passenger and express service of Western Air Express. Dudley M. Steele in charge of aviation for the Richfield Oil Company of California, spent last week in Wichita arranging for the building of a $20,000 servicing station at the municipal airport there for W.A.E. Other servicing stations are being built by the Richfield company at Kingman and Holbrook, Ariz., Albuquerque, N. M., and Amarillo, Tex. Steele says the planes will be stopping in Wichita by June 1.

Buffalo Airport Positions Open

BUFFALO (N. Y.)—Civil service examinations will be held here June 5 to secure eligibles for appointment as night operations manager at the airport and also superintendent of operations. Applications must be filed with the civil service commission by May 28.

Northwest Running Excursions

MINNEAPOLIS (MINN.)—Plane excursions from Minneapolis to Chicago over the week-end have been inaugurated by Northwest Airways Inc. Cost of the round trip is $35, which is $5 above the regular one-way fare.

Airport Men Discuss Problems

Enthusiasm Marks First Annual Meeting

CLEVELAND (OHIO)—Considerable enthusiasm marked the First Annual Airport Convention under auspices of the Aeronautical Chamber of Commerce held here May 15, 16 and 17. All sessions of the conference were well attended and the discussion periods were well followed up.

There were no attempts to secure resolutions, statements of policy and similar results by a vote or other action of the conference. It was stated by Capt. Clarence M. Knox of Hartford, Conn., vice president in charge of the Airport Section that the Chamber is acting merely as a focusing agent and clearing house for expressions of opinion.

All branches of airport activities and many of the allied interests like air transportation, were represented. Wide geographical representations were achieved also, some of the participants coming from Canada. Among those attending were some of the outstanding airport experts in this country.

Blee Outlines Questions

The conference convened at the Hotel Cleveland at 12:30 Wednesday, May 15, with Maj. John Berry, manager of the Cleveland Municipal Airport, presiding. Some of the main problems concerning airport engineers, operators, managers and allied interests today were outlined by Col. H. H. Blee, chief of the Division of Airports and Aeronautic Information of the Department of Commerce.

At the afternoon session which convened at 2, Gavin Hadden, civil engineer of New York City, gave a paper dealing with airport sites and sizes and described his tri-arc theory of airport construction. The importance of professional analysis of various soil properties in designing an airport were brought out in a paper by Wendell P. Miller, drainage engineer. F. H. Frankland, manager of the Technical Service, American Institute of Steel Construction, spoke on permanent airport structures, and Francis Keally, architect, and a staff member of the School of Architecture, Columbia University, gave a paper on the architectural treatment of modern airports. There were no meetings Wednesday night.

Co-operation Urged

The responsibilities of the airport to the air transport company and the need for co-operation in operation were described by George M. Lord, Western Air Express, at the session Thursday morning, May 16. Paving and various surfacing problems were dealt with successively by W. E. Rosengarten, traffic engineer of the Asphalt Association; George F. Martin, consulting engineer of the Barrett Company, and E. K. Smith of the highways and municipal

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Daily Air Mail Average Increases

WASHINGTON (D. C.)—Mail carried by air during April, 1929, totaled 510 725 lb., a daily average of 17,024, as compared with 523 414 lb for March, a daily average of 16 884 lb. Figures for the month indicate a decrease of 12 689 lb in April compared to March, but the daily average shows an increase of 140 lb a day due to the difference of one day in the two months. The poundage is tabulated as follows

	Mileage	Feb	March	April
Boston-N. Y.	192	6 198	7 559	7 573
Chicago-St. L.	278	5 558	6 789	6 245
Chicago-Dallas	1 059	21 205	28,963	29 204
Salt L. Los Ang.	600	50 127	58 427	53,905
Salt Lake-Pasco	530	14 616	16 823	16 078
Seattle-Los Ang.	1 099	16 085	19 849	18 801
Chicago-Minn	385	8,982	10 685	10 860
Cleve. Pitts	125	8,156	9 785	11,802
Chey. Pueblo	199	6 626	7 828	6 892
Cleve.-L'ville	345	6 497	5 951	6,159
N. Y.-Chicago	772	101,596	114 257	122,766
Chicago-San F.	1 918	114 725	135 668	126 901
N. Y. Atlanta	765	18,557	25 648	21 192
Albany-Cleve	446	6 678	8 955	8 510
Dallas-Galv	318	3 585	4 070	5 257
Dallas-Browns	423	5 468	7 416	6 975
Atlanta New O	485	3,125	7 558	7 009
Chicago-Cinn	270	7 056	5 261	5,557
Atlanta Miami	622	10,291	15 521	9 572
Gr. Falls-Salt L	489	5 606	4 215	5 970
Chi. Bay City	522	8,452	9 509	14 802
N. Or.-Houston	519	1 482	2,956	3,458
Chicago-Atlanta	785	7,104	10 471	8,764
Total	13 050	455 581	523 414	**510 725

Scheduled daily mileage 30 865
**Decrease, 12 689 April over March.

Competition Not Feared

HARTFORD, (CONN.)—Unified control of air lines throughout North America, strengthened by the exclusive airmail contracts, means that there is little to fear from the competition of the small independent companies, declared Frederick B Rentschler, president of the United Aircraft and Transport Corporation here recently. Cost of huge transport planes also tends to rule out the small operator he said, and declared further, "The continued successful performance of mail and passenger planes is having its effect on the public and the outlook is extremely bright."

Makes "Mail Order" Markers

MINNEAPOLIS (MINN.) — Aviation markers conforming to Department of Commerce regulations and sold on the mail-order principle are now being manufactured here by the Continental Aviation Marking Service. The markers are stamped from sheet steel and are painted yellow. They are available in various sizes and include letters for names of towns and cities airport direction arrows and compass arrows. Complete instructions for setting up on any type of roof are provided.

To Operate Mile Square Port

WASHINGTON (D. C.) — United States Air Transport Inc., has signed an agreement with Henry Woodhouse, president of the Aerial League of America, by which it will take over the development and operation of the Mile Square Airport, near Alexandria Va.

Tow Braniff Planes To Take-Off Point

OKLAHOMA CITY (OKLA.)—All transport planes of Braniff lines operating in the Southwest are to be hauled by tractor and truck from the loading station or waiting room to take-off positions following a recent announcement of company officials in an effort to eliminate the dust nuisance created by skids of planes.

Developing New Mobile Mast

LAKEHURST (N. J.)—Experiments are nearing fruition, it is said, on a new type of mobile mooring mast for airships.

Equip Boeing Fleet With Radio-phones

SAN FRANCISCO (CALIF.)—Among the first tri-engined passenger planes, operated on regular schedules over established routes in the United States, to be equipped with radio phones, will be the Boeing System tri-engined transports to be operating daily between San Francisco Oakland and Salt Lake City, Boeing System officials have announced.

Work of installing the radiophone equipment on these planes is nearing completion. It is substantially the same type as that used on the mail planes, and with it Boeing pilots can talk to ground stations 200 mi. distant and Boeing pilots can even talk to planes 175 mi. away.

St. Louis Plan Not Favored

ST. LOUIS (MO.)—The proposal to establish a direct air mail route from St Louis to New York by way of Cincinnati and Pittsburgh received little encouragement from Assistant Postmaster General Glover it was reported by members of the Chamber of Commerce Air Board on its return from Washington. However, the local organization will continue their efforts to get the line established. The trip was made in a Fokker F-10 transport of the Universal Aviation Corporation. The plane probably will be placed in service on the projected St Louis Cleveland line.

La Crosse Gets Radio Beacon

LA CROSSE (WIS.)—Installation of an aviation radio beacon will begin here about June 1 with the beacon scheduled for use in connection with the air mail run from Minneapolis to Chicago, to be in operation by June 20. Planes of Northwest Airways, air mail contractors for the line, are now being equipped with radio receiving apparatus.

Pyle-National Lights Fort Worth Airport

FORTH WORTH (TEX.)—Following considerable experimenting with the problem of lighting Meacham Field here by the Pyle-National Company of Chicago, work is now going ahead with the installation of the company's "distributed lighting" system. This consists of twelve Type 2375 projectors, six of which are mounted on the hangar roof at spacings of about 170 ft., and three each to be placed on the north and south sides of the field spaced at about 200 ft.

The distributed method it is declared, allows for meeting individual requirements, the main problem at Fort Worth being overcoming the problem of contour. The center of the field is higher than the surrounding area, and there is a decided shallow section at one side of the field. Forty-degree lenses are used. Horizontal louvres give a sharp cut off of the upper light beam. A 1500-watt, 110-volt, PS-52 lamp was used. The installation is costing $5 000.

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bureau Portland Cement Association.

Two of the most interesting papers of the conference were given Thursday afternoon by W. R. Gregg, senior meteorologist of the Weather Bureau, United States Department of Agriculture, and by F. S. Hingsburg, chief engineer, Airways Division, Department of Commerce.

A prediction that there will be 500,000 privately-owned planes in this country within two years was made by William B. Stout at the annual dinner Thursday night. He expects to see in operation 10 000 privately-owned planes by the middle of next year. He also emphasized the rapid changes which are ahead of aviation within the next few years. Other speakers included W. Irving Glover, Colonel Blee and Maj. M. K. Kennedy of the Air Corps who has charge of construction work on all Army fields.

On account of the large volume of questions which had been submitted to the conference officials, it was decided to devote Friday morning of the last day of the conference to a discussion of these questions. Colonel Blee presided. At the luncheon that noon, Buffalo was chosen by the delegates as the meeting place for the conference sometime in May next year.

At the closing session papers were read by Professor H. J. Freeman, School of Law, New York University, on the legal aspects of airport establishment and operation. A demonstration of the control of airport lighting equipment was given by L. S. Simpson of the Commercial Lighting Section of the Westinghouse Electric and Manufacturing Company. More than 200 attended the various sessions.

[A more complete discussion of the conference will be given in an early issue of AVIATION. —EDITOR.]

To Expand Model Route Weather System

OAKLAND (CALIF.)—Enlargement of the model airway weather reporting system between Oakland and Los Angeles on July 1, when the Government takes over the work now carried on by the Guggenheim Fund for the Promotion of Aeronautics, was recently announced at Oakland Airport.

Besides linking the airways radio communication stations now being completed on the Pacific Coast by the Department of Commerce to the Oakland-Los Angeles system, five intermediate landing fields of the Department will be added. The fields to be added include Livermore, Concord, Livingston, Tejon and Saugus.

Weather reports will be furnished by the airport bureaus to the airways radio stations by means of the teletype system and broadcast hourly for the guidance of radio equipped planes.

Add to Detroit City Airport

DETROIT (MICH.) — The Detroit City Council recently approved a contract between the City and the Detroit City Gas Company for the purchase of 18.6 acres of gas company property as an addition to the present Detroit City Airport. The property lies in a triangular strip north of the east-west leg of the L-shaped airport and its addition will have the effect of widening, but not lengthening that particular extension. A price for the 18.6 acres is to be set by an appraising committee from the Detroit Real Estate Board. Acquisition of the gas company land will give the city airport a total area of approximately 250 acres.

Hartford May Be Port of Entry

HARTFORD (CONN.)—Formal application has been made to have Brainard Field, Hartford's airport, designated as an official port of entry to the United States. The Pratt & Whitney Aircraft Company is the sponsor of the movement, being especially interested because of the necessity for flying to and from the Canadian Pratt & Whitney Aircraft Company in Montreal.

Inspectors from the customs house in New York intimated that their recommendation would be favorable.

Officials to Attend Conference

BOISE (IDA.)—Governors and members of the legislative and executive branches of all western states are expect to attend the Western States Air Commerce and Airways Conference to be held here July 8.

Publishes Hangar Data

PITTSBURGH (PA.)—An elaborate booklet on hangar design and construction, in filing form for easy reference and profusely illustrated, has been produced by the H. H. Robertson Company.

Urge Lights for Florida Ports

MIAMI (FLA.)—A movement has been started by the Florida State Chamber of Commerce, through its aviation committee, to induce East Coast cities to light their airports so that the air mail service may be speeded by being placed on night schedule.

Central to Open New Service May 26

WICHITA (KAN.)—Opening of service on the third division of Central Airlines to Oklahoma City will take place May 26 according to announcement of E. A. Watkins, president of the company. Two planes will operate between the two cities daily, connecting at Oklahoma City with planes of the Braniff lines flying to Dallas, Tex.

The Central company has been operating planes between Wichita and Tulsa and Wichita and Kansas City for some time. A merger of the Central and Braniff lines is practically completed. The two concerns cover most of Kansas, Oklahoma, Missouri and Texas. Twenty-five passenger planes are owned by the two outfits.

Kansas City Reports Traffic

KANSAS CITY (KAN.)—Air passage travel is showing big gains, according to officials of the different air lines operating in and out of Kansas City. Universal Air Lines, operating between here and St. Louis with one schedule also to Omaha, had 51 passengers between May 6 and 11. Southwest Air Fast Express in the same period flew 28 passengers between here and Dallas. Yellow Cab Airways, Inc., handled nine passengers from here to Des Moines and Minneapolis in its first five days of operation starting May 7. Nine other passengers were handled by the Central Air Lines between Kansas City, Topeka, Wichita and Tulsa.

California Operators in Drive

SAN FRANCISCO (CALIF.)—Plans for the expansion of the California Aircraft Operators' Association were formulated at the monthly meeting May 16. Members agreed to conduct a 30-day drive for additional membership from the ranks of southern California aircraft, engine and aviation accessory manufacturers, at the end of which time it is planned to vote on a proposition to change the name of the organization.

Announces Seaplane Service

NEW YORK (N. Y.)—Atlantic Coast Airways Corporation has announced a seaplane passenger service between here and Atlantic City beginning in May. The route will be flown every two hours between 5 20 a.m. and 6 p.m., planes leaving both terminals simultaneously. Moorings at Atlantic City will be near the board walk and transportation services.

Curtiss to Start Atlantic City Line

NEW YORK (N. Y.)—Using a fleet of Wasp engined Sikorsky amphibions the Curtiss Flying Service is planning to establish a 60-min. service between here and Atlantic City by June 1. The following schedule has been announced: Leave here daily, except Saturday and Sunday, at 9 a. m. and 5 30 p. m.; leave Atlantic City at 8 30 a. m. and 6 p. m. On Saturday a plane will leave here at 12 30 p. m. and one will leave Atlantic City at 8 30 a. m. On Sunday there will be but one plane in operation that will be from Atlantic City at 6 p. m.

A system of giving weather and other information to the pilots by panels placed at 15-mi. intervals has been devised, according to the officials. Planes will be flagged down if it is deemed dangerous to proceed. Fares will be $30 one way and $54 round trip. Landings here will be made at North Beach, Flushing, and on Bader Field, Atlantic City.

E-R to Operate Piqua Field

PIQUA (OHIO)—Embry Riddle commercial aviation organization of Cincinnati has just closed a deal with Acton A. Hall, vice-president of the Ohio Marble Company, whereby the Cincinnati company will operate the Marble firm's new flying field here. Mr. Hall is building a hangar, capable of housing eight machines, which will cost approximately $10 000. Doors will be large enough to admit any of the largest type machines. In addition to the hangar, runways are to be constructed and the entire field on the old Troy pike will be leveled. Embry-Riddle is to install several planes for commercial work and for pupils and a school in aviation is to be opened within the month.

Consolidated Plans New Port

BUFFALO (N. Y.) — Development of a new airport in Military Road, Tonawanda, is being undertaken by the Consolidated Aircraft Corporation, according to an announcement made public here last week by Ray P. Whitman, assistant general manager. The new field will cover 80 acres and will have two runways in the direction of prevailing winds. A modern hangar will also be erected. The new airport will be used by the National Flying School and by Niagara From the Air, a concern recently formed by Consolidated interests for sightseeing.

To Discuss Airport Paving

NEW YORK (N. Y.)—Use of asphalt in airport paving will be a topic for discussion at the Eighth Annual Asphalt Paving Conference to be held at West Baden, Ind., October 28 to November 1, it has just been announced by officials of The Asphalt Association.

FOREIGN ACTIVITIES

Program for Air Congress Announced

THE HAGUE (HOLLAND)—Plans are maturing rapidly for the holding of the Fifth International Air Congress here September 1-6, 1930. The Royal Aero Club of the Netherlands, requested by the government to handle the organization details, has announced the general topics for discussion to be: Aerial traffic, science and technique, legal questions, medical questions and aerial touring.

The first section will discuss such topics as organization of air routes, staff, material, radio communication, airlines in relation to finance and cooperation with other means of transportation and meteorology. The second section will take up construction of planes, methods of propulsion, theoretical and applied aerodynamics, instruments and apparatus for aerial navigation and the airplane as compared with other mediums of aerial transport.

The legal section will deal with common rights, administrative rights, private rights and private administrative rights while the medical section will study physiology, hygiene and such questions as the employment of women in public air services and methods of examination, etc. The last section will consider international aerial touring and the problems that involve facilities, cooperation of international touring clubs and medical examination of tourists and pilots, safety of air tourists, inspection and examination of pilots and propaganda for the popularization of air touring.

The first congress was organized and passed under the auspices of the French Government in 1921. The second was held in 1923 in London under the auspices of the British Government, the third in Brussels in 1925 under the auspices of the Belgian Government and the fourth in Rome in 1927.

Wins $1,200 for Glider Flight

DETMOLD (GERMANY)—Traveling over 60 mi., Robert Kronfeld, Vienna, is said to have won a prize of $1,200 for having set a distance mark for gliders. The take-off was made from Riesenbeck and the flight consumed more than five hours.

Plan Ford Canadian Plant

WALKERVILLE (ONT.) — Stout Metal Airplane Division of the Ford Motor Company is to build a plant here for the construction of tri-engined transports, it is reported. It is expected the planes will have wide use.

Air Parade Climaxes Airport Drive

VANCOUVER (B. C.) — Seventeen planes circling this city hummed an appeal to citizens to vote for the airport bylaw which is to come before the taxpayers soon. The air parade was the climax of an intensive campaign to interest ratepayers in the establishment of air terminal facilities, for which a sum of $300,000 is asked.

To Show Secret Craft at Olympia

LONDON (ENGLAND)—One of the closest kept secrets of the British Air Ministry will be revealed to the public at the International Aero Exhibition to be held at Olympia, London, in July. This secret is a small aeroplane which has specially been constructed to fit into a submarine. For many years experiments have been made in order to perfect such a machine and to evolve a method of carrying it on to the submarine without greatly altering the construction of the craft.

The machine that will be shown at the exhibition is the outcome of these experiments and it is one of the most modern of the developments of warfare. Other machines which have been kept secret by the Air Ministry will also be shown, while side by side with these will be practically every type of modern civil machine from small coupes to enormous air liners capable of seating over twenty people.

Foreign News Briefs

Quebec and Eastern Aviation Corporation of Canada has ordered three Fairchild 71's.

Capt. Hermann Koehl is to be offered the presidency of the German League of Flying Men now being organized.

R. A. MacLean, who last year lost an eye in a crash following a stall, has invented an ear buzzer device said to warn the pilot of the approach of the stall. Two electrical contacts are placed on a wing strut in connection with a "rat trap" speed indicator.

Capt. Eben Wen-Lin, Chinese pilot, and his companion, Lieutenant Johannsen of Denmark have completed their flight from England to China, started in March.

Berne, capital of Switzerland, will open its new airport in June. It is expected it will be used extensively for flights over the mountains.

Pan American Airways has established a line connecting Managua, Nicaragua, with its main service. A mail route has been started between Vera Cruz and Tapachula, in the state of Chiapas.

The Duchess of Bedford, although 63 years old, is an air enthusiast and is planning to try for a new non-stop record to India, using a Fokker, the Princess Xenia. She will share the controls with Capt. C. D. Barnard.

The international congress on sanitary aviation opened at Paris May 14 with delegates from 35 countries in attendance.

Encourage Private Flying in Littorio Show

ROME (ITALY)—To encourage private passenger flying, a national exposition will be held at the Littorio Airport near here, May 27-June 9, under the auspices of La Compagnia Nazionale Aeronautica in conjunction with the Royal Automobile Club, the National Fascist Association, and manufacturers of aeronautic and automobile equipment, according to Asst. Trade Commissioner D. F. Spencer.

Firms permitted to have an exhibition include Italian manufacturers of passenger airplanes and all those associations, societies, corporations and firms which are recognized as taking an active part in the development of the aeronautic industry in Italy. Exhibits will be classified in the following manner: (1) Touring planes with horsepower not greater than 100 regardless of type; (2) aircraft engines of any type and horsepower rating; (3) aircraft engine accessories; (4) safety apparatus, such as parachutes and fire extinguishers; (5) flying accessories, small hardware, leathers, varnishes, wood, special metals, tires, wheels, compasses; (6) scientific instruments for aerial navigation, lighting plants; (7) lubricants; (8) newspapers, reviews and publications carrying aeronautical propaganda; (9) flying clothing, and (10) commercial aerial navigation.

Seta Seaplane Speed Record

BERLIN (GERMANY)—Attaining a speed of 173.284 2 m.p.h. in a seaplane with a load of 102.31 lb. extra weight, Chief Pilot Starke of the Heinkel Airplane Works established a new world record for that class. He bettered the previous record of 136.023 m.p.h., set by Lieut. S. W. Calloway, U.S.N., in April 23, 1927, in a Wasp Corsair.

Air Section in Vancouver Show

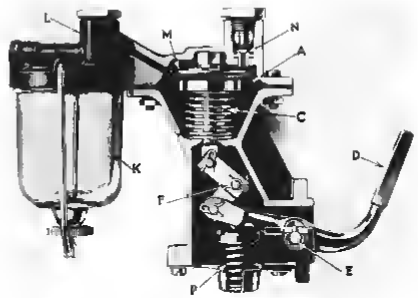
VANCOUVER (B. C.)—An aircraft section is to be a feature of the Canada Pacific Exhibition to be held in this city Aug. 7-17. Dominion Airways already has contracted for space.

THE BUYER'S LOG BOOK

AC Fuel Pump

IN ORDER to insure a continuous flow of fuel to the carburetor, particularly during certain maneuvers, a fuel pump is useful on an aircraft engine. A device of this type has been developed by the AC Spark Plug Co., Flint, Mich., and is now being used on the Hispano powered Eaglerock and other commercial airplanes.

The AC fuel pump is a diaphragm pulsating pump a self priming device. The pump is operated by a lever



The AC Fuel Pump with a portion cut away to show operating mechanism

that is given a reciprocating motion of $\frac{1}{16}$ in. to $\frac{1}{4}$ in. from the camshaft or other rotating member of the engine. The pump draws fuel from the rear tank through a sediment chamber and strainer which is a part of the pump unit and feeds it under pressure to the carburetor in strict proportion to the requirements of the engine.

By referring to the sectional drawing its simplicity is evident and the operation is as follows.

The turning of the camshaft lifts rocker arm *D* which is pivoted at *E* and pulls the linkage downward.

Diaphragm *A* is drawn downward against spring *C* thus creating a vacuum in pump chamber *M* which causes fuel from the tank to flow through the strainer K and suction valve *L* into the pump chamber *M*. On the return stroke spring *C* pushes diaphragm *A* upward, forcing fuel through pressure valve *N* into the carburetor. When the carburetor bowl is filled its float shuts off the needle valve, thus creating a back pressure in pump chamber *M*. This pressure will hold the diaphragm *A* against the pressure of spring *C* preventing further pumping until the carburetor requires more fuel and its needle valve opens. Spring *P* is merely to keep the operating lever *D* in contact with the eccentric on the camshaft.

As lever *D* follows the eccentric at all times and as the diaphragm piston stroke is in proportion to fuel requirements, it will be evident that the linkage *F* will compensate for the difference in travel of these two moving parts. Under normal operating conditions the diaphragm stroke is only a few thousandths of an inch which means that the life of the pump and its capacity will be far in excess of any engine requirements.

The AC fuel pump weighs 3 lb., requires no priming and does not effect engine carburetion at any speed. It has been tested in temperatures ranging from —30 to +200 deg. F. At cranking speed the pump will supply 5 cc. of fuel per engine revolution. With a $\frac{1}{4}$ in. movement of the diaphragm it pumps 10 cc. per stroke, or enough to fill 14 in. of $\frac{7}{16}$-in. diameter tubing. This over capacity ranges from 75 to 100 per cent.

"N" Series Altimeter and Tachometer

TWO new aircraft instruments were recently introduced by the Consolidated Instrument Company of America, Inc., 305 E. 47th St., New York, N. Y. These instruments are designated the type "N" altimeter and type "N" tachometer.

The type N tachometer is equipped with a helical gear drive to produce smoothness and quietness in operation. Another feature in this instrument is the uniform scale over the entire dial. The scale is such that the pilot is instantly assured of an accurate reading of the slightest speed variation. The type N tachometer is mounted in a non-corrosive case and is designed to meet all Army and Navy specifications. S.A.E. standard head and flexible shaft connections are employed. The weight of the instrument is 12 oz.

The Consolidated type N altimeter, which weighs 13 oz. is well balanced and has been designed and constructed to meet Army and Navy specifications. This

Photographs of the Type N Tachometer (left) and Altimeter (right)

altimeter is equipped with barometer setting scale to enable the pilot to correct his altimeter readings at points of varying atmospheric pressure. A knurled knob is provided for adjustment of the reading to the zero position. The scale is 2¾ in. in diameter and uniformly graduated from 0 to 20,000 ft. The dial is exceptionally easy to read because of the widely spaced graduation marks and clear cut figures. Like the type N tachometer this instrument is also mounted in a non-corrosive case.

SIDE SLIPS

By
Robert R. Osborn

AT A RECENT MEETING of the Society of Motion Picture Engineers Mr Jones, a physicist employed by the Eastman photographic laboratories, announced "a method of tinting talking films to any of the sixteen desired colors, each designed by him, to stir in the onlooker the emotions appropriate to the scene depicted on the screen." Reading further along in the newspaper account we find that one of the available colors is called inferno, [illegible] a fiery red suitable to dire scenes,—battle riot panic, anarchy, mobs turmoil strife, war and unrestrained passion."

If this development has reached the practical stage we think the movie producers now have suitable equipment to make the picture we suggested a while ago,—a "talkie" of a hard-boiled pilot trying to taxi a light ship, without brakes or steerable skid down wind on a very windy day.

• • •

From Mr. C. T. M. E. in San Francisco, Calif. comes the newspaper clipping describing a new engine cooling liquid, from which we quote: "The liquid is placed in the plane's motor

through which it circulates, and regardless of how many revolutions per minute the propeller makes or how great a weight is hauled, the motor remains as cool as an iceberg."

Aside to Deak L. and Leo K. of New York City, who offered themselves as test pilots for any new liquids developed in aeronautics: Apparently this stuff isn't going to need any cracked ice but you might see how it mixes with ginger ale.

• • •

Lieutenant Commander Rosendahl, former skipper of the 'Los Angeles" will be placed in charge of the Rigid Airship Training and Experimental Squadron at Lakehurst N. J. according to a recent Navy Department announcement. His work in the new squadron will be the training of new officers and men for the new huge dirigibles which are on the Navy's construction program. Considering Dr.

Eckener's statement that the Graf Zeppelin was too small for anything but training purposes, we suppose the Los Angeles will be turned over to solo students for practicing landings.

• • •

The Intrepid Aviator wandered in a short time ago with a clipping from a magazine advertisement of a large manufacturer of collars and shirts. The manufacturer announces a new line of shirts which he calls "Airtone" shirts,— They're as fresh as the morning's air-mail. They're air-minded. They're air-styled. Their basic colors are the hues of sky and clouds. These pastel tones are traced with tiny lines of color—air lanes, if you please."

The Intrepid Aviator says he must have been wearing these shirts for some time now as he has often started out with a shirt looking like a soft cloudless sun-rise, which after a few hours in open cockpit planes changed to a fair representation of a line squall.

• • •

Mr. H. P. calls our attention to the news item from Kansas City: "Dr. A. J. Klimak operator of Klimak's Lodge Baudette, Minn., has purchased a Kinner powered American Eagle biplane for use in transporting guests at his lodge on sightseeing tours and taxi trips. The plane will bear the slogan: 'Peter and Paul, Apostles of the Air.' Peter and Paul being the names of the pilots of the plane."

We hope none of the passengers will make a practice of 'robbing Peter to pay Paul" for their flights.

• • •

Mr. C. L. M. of New Haven Conn. protests most loudly of a number who have written in to say that it is about time one of our famous "seventeen-year-old aviatrixes' became eighteen years old. Once in a while in this space we print some unfavorable comments on lady fliers most of them predicated on the probability that lady fliers of the future will be as erratic, exasperating and dangerous as lady car drivers are today. However, when we find one who really can fly—and fly well, we like to lead the cheering for her. The particular lady to whom C. L. M. refers can fly well and as far as we are concerned she can take as many years to become eighteen as Mr. Vincent Richards did.

• • •

People have been knighted for less than this. "Cancel all previous records. Carried the first electric stove in a glider today." Message from E. D. of Webb City, Okla.

• • •

An American group is making plans, still in the 'conversational" stage, according to the newspaper accounts, for a Trans-Pacific dirigible line connecting the Pacific coast of this country and the Orient. The article describes the proposed dirigibles as follows: "The conversational' plans call for the construction of two super-dirigibles of 6,500,000 cu. ft. capacity each, with accommodations for sixty to one hundred passengers and cargo space for from 10,000 to 20,000 lb. of mail, express and baggage. With a contemplated speed of 100 m.p.h., the air liners would greatly reduce the travel time between the Pacific Coast and the Orient."

There's American conservatism for you. A long time ago the British announced that their new dirigible would carry a kitchen capable of serving a seven course dinner and so far we haven't heard of it making any successful flight tests. We remarked, at the time of the first announcement, that with the present advancement of the aeronautical art they could probably develop a ship capable of only a four or five-course dinner. The fact that the ship has not yet made its

appearance proves that we were right,—their seven-course dinner must be unable to pass the 50-hr. bench test. The Americans don't mention the kitchen at all, but stick to conservative performance and capacity data that no one could check even if he so wished.

Flyers call it the safest and most dependable light plane for SPORT *and* TRAINING

THE OUTSTANDING SPORT AND TRAINING PLANE IN THE WORLD

PUT the Whittelsey Avian through its paces. Not with the conscious effort of a "show-off" but with the supreme ease of a born aristocrat this famous light plane responds to every wish and whim of its pilot.

From the moment you give it the gun until it floats into a gentle three-point landing, propellet still, stick dead, the Avian gives a flying performance that is a happy combination of stability, ease-of-handling, speed, durability and safety.

It's the creation of genius. It must be. For since it first took to the air, more than six years ago, to write in the sky-lanes of the world a glorious history of achievement, many designers have attempted to duplicate the Avian. They have copied it line for line, angle for angle. Still, the Avian remains the choice of the experienced pilot—as a ship in which to train the fledgling, as a ship to fly for sport.

1. You can't take it off the front porch. But no light plane is quicker to lift its nose into the air and leave the ground behind. By the same token, you can land the Avian in any pasture of decent size.

And from take-off to landing the Avian will give you the most comfortable, satisfying flight.

Among the features that make the Avian the most suitable flight plane for day-in and day-out flying—whether training or touring—are:

SAFETY. With 8 the factor of safety the Avian is one of the most popular planes for sport and training. Airworthiness permits aerobatics at a total loaded weight of 1450 pounds, normal flying at a weight of 1600 pounds. The Avian, pilot, passenger and 50 pounds of baggage weigh 1410 pounds.

2. Slotted wings (Handley-Page) make a spin practically impossible. And statistics show that the accidents due to spins exceed in number those due to all other mechanical difficulties and human mistakes. This safety feature also allows the landings of the Avian at slower speeds.

ECONOMY OF OPERATION. Fuel consumption 20 miles per gallon and oil consumption 500 miles to the gallon.

EASE OF MAINTENANCE. Most working parts being fitted with lubricators, indicate the ease with which the Avian can be maintained. The engine is at comfortable height from the ground for purposes of adjustment. Engine cowling can be detached in a few moments.

The whole of the fuselage is separated from the power unit by a fireproof bulkhead.

3. COMFORT. The cockpits of pilot and passenger are roomier and more comfortable than usual. Occupants are protected by adequate windscreens. The luggage compartment behind the pilot's seat is large enough to accommodate two full-sized suitcases, tools, spare tire, etc.

4. EASE OF HANDLING. One person can fold or spread the wings unassisted. When wings are folded one person can easily lift the tail and manoeuver the machine without effort. The wide track of the undercarriage and the steerable tail skid make taxying easy.

When the wings are folded the Avian occupies a space only 9¾ feet in width (1-3 its width when wings are spread). It can be garaged in any ordinary shed.

For training purposes the Avian has a dual control. For sport flying the control column in the front cockpit can be removed and the rudder bar disconnected.

Records it holds. — First solo flight England to Australia. Fastest time England to Australia . . . Longest flight ever made in a light plane . . Longest solo flight ever made . . . Fastest time England to India . . First non-stop flight, London to Rome.

Write for information. If you are interested in the Whittelsey Avian as a purchaser or if you plan the conduct of a training school, write us. We will gladly forward complete and detailed information concerning this light training and sport plane. Its price is $4995 flyaway or F. O. B. Bridgeport, Conn. Whittelsey Mfg. Company, Dept. D 5, General Office and Plant, Bridgeport, Conn.

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MONEY TO BE MADE—We are completing national distribution and arranging representation in the leading aviation centers of the country. Interested and responsible parties are invited to write for further information concerning sales plan and territories available. Whittelsey Mfg. Co., Bridgeport, Conn.

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IN AMERICA

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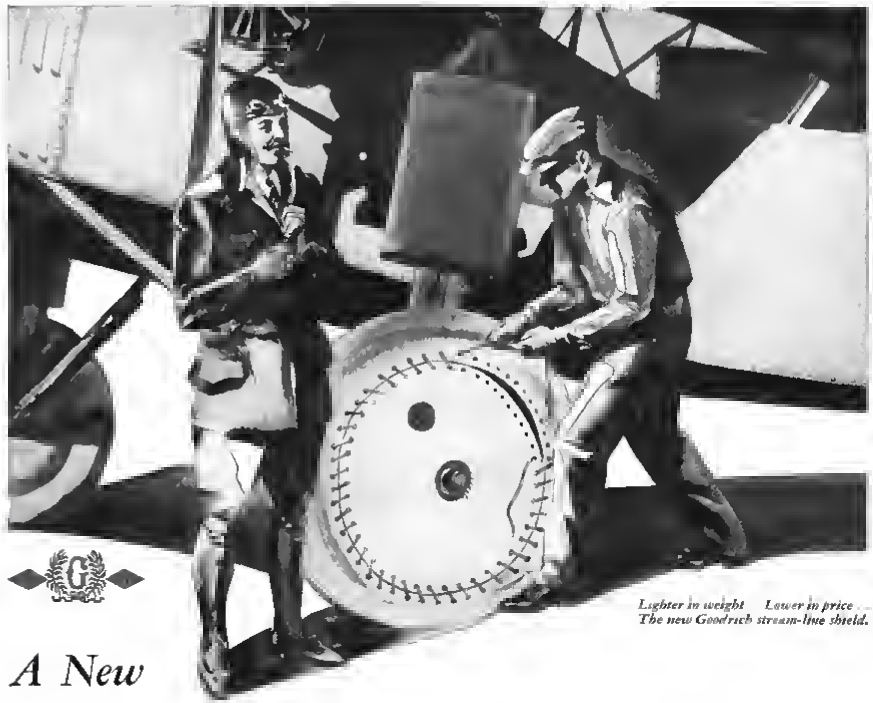

Lighter in weight Lower in price
The new Goodrich stream-line shield.

A New

Fabric Stream-line Shield
that reduces air mile cost

WITH the announcement of the new Goodrich fabric windshield Goodrich makes possible *lower* air mile cost. Heretofore the Goodrich Stream-line Shield could be purchased in rubberized fabric only.

Now the same patented features may be had in the new fabric shield—identical save in materials—at a *one-third* price reduction!

The new shield not only combines all the exclusive wind drag reducing features of the Goodrich *rubberized* shield, but it also *reduces unit weight and cost of the stream-line wheels.*

It is made of No. 47 *friction fabric* with reinforced edges, grommeted and laced to the skirt of a Goodrich Airplane tire.

Already one leading plane manufacturer has *standardized* on the new Goodrich *Fabric* Stream-line Shield. Other inquiries are invited.

The B. F. Goodrich Rubber Company, Established 1870, Akron, Ohio. Pacific Goodrich Rubber Company, Los Angeles, Calif. In Canada: Canadian Goodrich Co., Kitchener, Ont.

Goodrich *Rubber for Airplanes*

9 Acres of Ball Bearing Manufacturing

. . . to satisfy the services that demand the finest

SINCE 1911, the Fafnir Bearing Company has steadily grown to meet the ever-increasing demand for fine ball bearings. Today it is one of the largest ball bearing plants in the world, with manufacturing facilities and engineering skill that are unsurpassed.

Greater capacity with minimum friction has been the goal of Fafnir research and design. Witness the result in the large diameter molybdenum balls and the deep races of this tough wear resisting steel, which combine in Fafnir Ball Bearings to produce the greatest friction-free load capacity, and minimum bearing weight.

Use our engineering staff and research facilities as your laboratory. Their services are freely offered to assist you in obtaining the exact type and size for any specific need.

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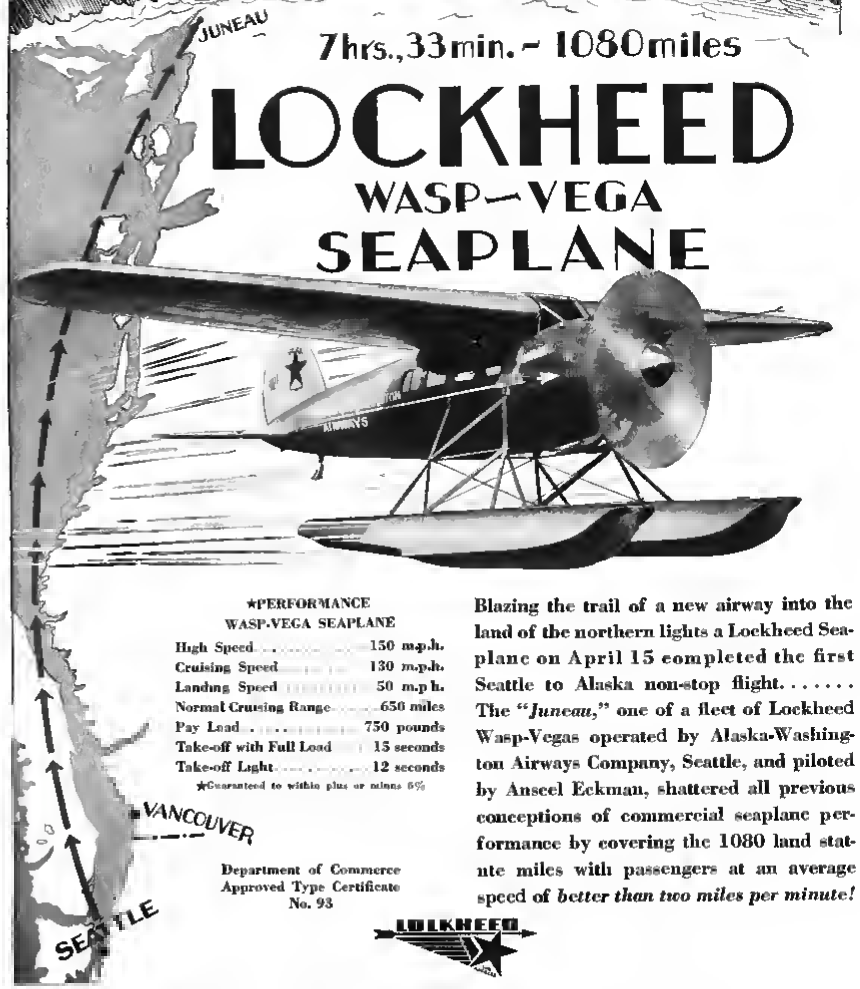

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WASP-VEGA SEAPLANE

High Speed	150 m.p.h.
Cruising Speed	130 m.p.h.
Landing Speed	50 m.p.h.
Normal Cruising Range	650 miles
Pay Load	750 pounds
Take-off with Full Load	15 seconds
Take-off Light	12 seconds

★Guaranteed to within plus or minus 5%

Department of Commerce
Approved Type Certificate
No. 93

Blazing the trail of a new airway into the land of the northern lights a Lockheed Seaplane on April 15 completed the first Seattle to Alaska non-stop flight. . . . . The "*Juneau*," one of a fleet of Lockheed Wasp-Vegas operated by Alaska-Washington Airways Company, Seattle, and piloted by Anscel Eckman, shattered all previous conceptions of commercial seaplane performance by covering the 1080 land statute miles with passengers at an average speed of *better than two miles per minute!*

LOCKHEED

LOCKHEED AIRCRAFT COMPANY, Los Angeles, U.S.A.

THANK YOU *for mentioning* AVIATION

The real facts *about the* *Kinner Powered* American Eagle *Biplane*

When the first Kinner Powered American Eagle Biplane was built, we were confident that it would become the outstanding new airplane of the year. That expectation has been confirmed by the reports of flyers testifying to its wonderful performance. But no testimonial could be more significant than the following actual statistics:

Twelve and seven-tenths per cent of all new production type biplanes now in use are American Eagles.

This fact speaks for itself. The Kinner Powered American Eagle Biplane has won record-breaking popularity through record-breaking *performance*. We are eager to demonstrate.

See the American Eagle dealer nearest you—or write us direct. An extraordinary proposition is now being offered to dealers and distributors.

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PILOT C. P. CLEVENGER, out of the wealth of his 10 years' flying experience, explains in simple, interesting language, every movement of the controls for take-offs, landings, straight flight and aerobatics in his nationally famous instruction book—
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STUDENT PILOTS and young men about to enter the game can cut down the number of hours usually necessary before soloing through the wise investment of One Dollar

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SUPERCHARGERS

A GENERAL ELECTRIC CONTRIBUTION TO THE SAFETY AND PROGRESS OF FLIGHT

G-E superchargers are small, high-speed centrifugal compressors, built in as a part of an airplane engine, to serve the following purposes:

1. Improvement in distribution.
2. Simplification of carburetors.
3. Moderate or appreciable increase of power at sea-level.
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G-E superchargers are standard equipment on practically all leading aviation engines.

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GENERAL ELECTRIC CO. SCHENECTADY, N. Y.

Who *pays* the fiddler when sightseers *play tag* with a plane

WHEN sightseers race out on the field after a plane, the Grim Reaper may join in the chase. If old G R catches Mr. Sightseer .... who pays for the game of tag?

Mr. Sightseer? Yes, and the owner of the plane, or of the airport may also have to contribute....a damage suit costs money.

Many airport operators have minimized this risk....protected themselves and their clients .... and reduced insurance costs. With the assistance of an Anchor Fencing Specialist proper enclosures and barriers have been erected so as to positively restrict sightseers to safe areas.

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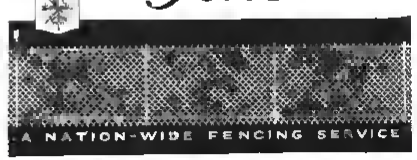

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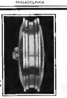

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(Continued on the following page)

WHERE TO FLY

Continued from preceding page

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AVIATION

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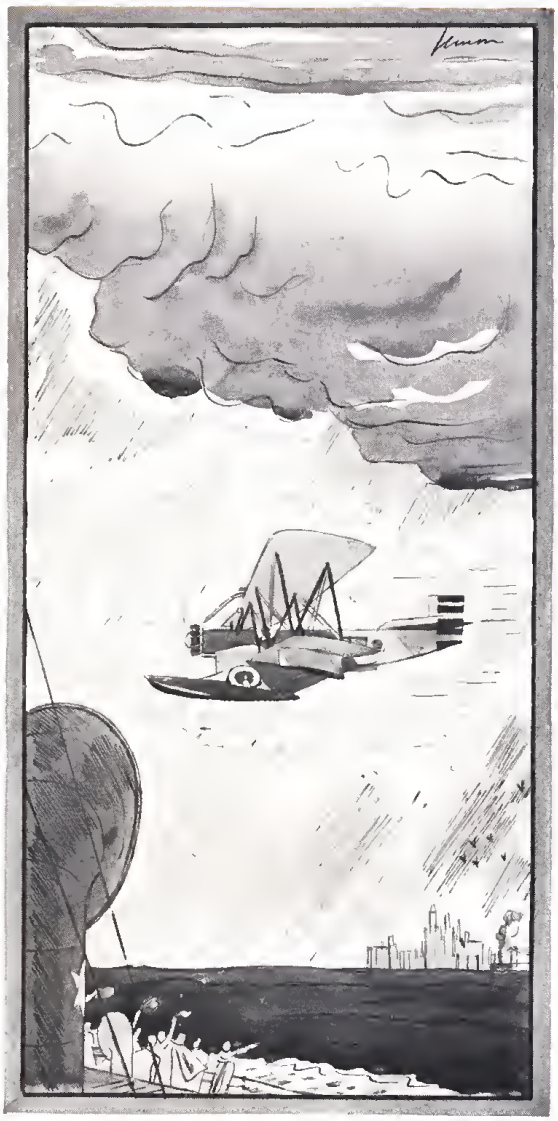

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